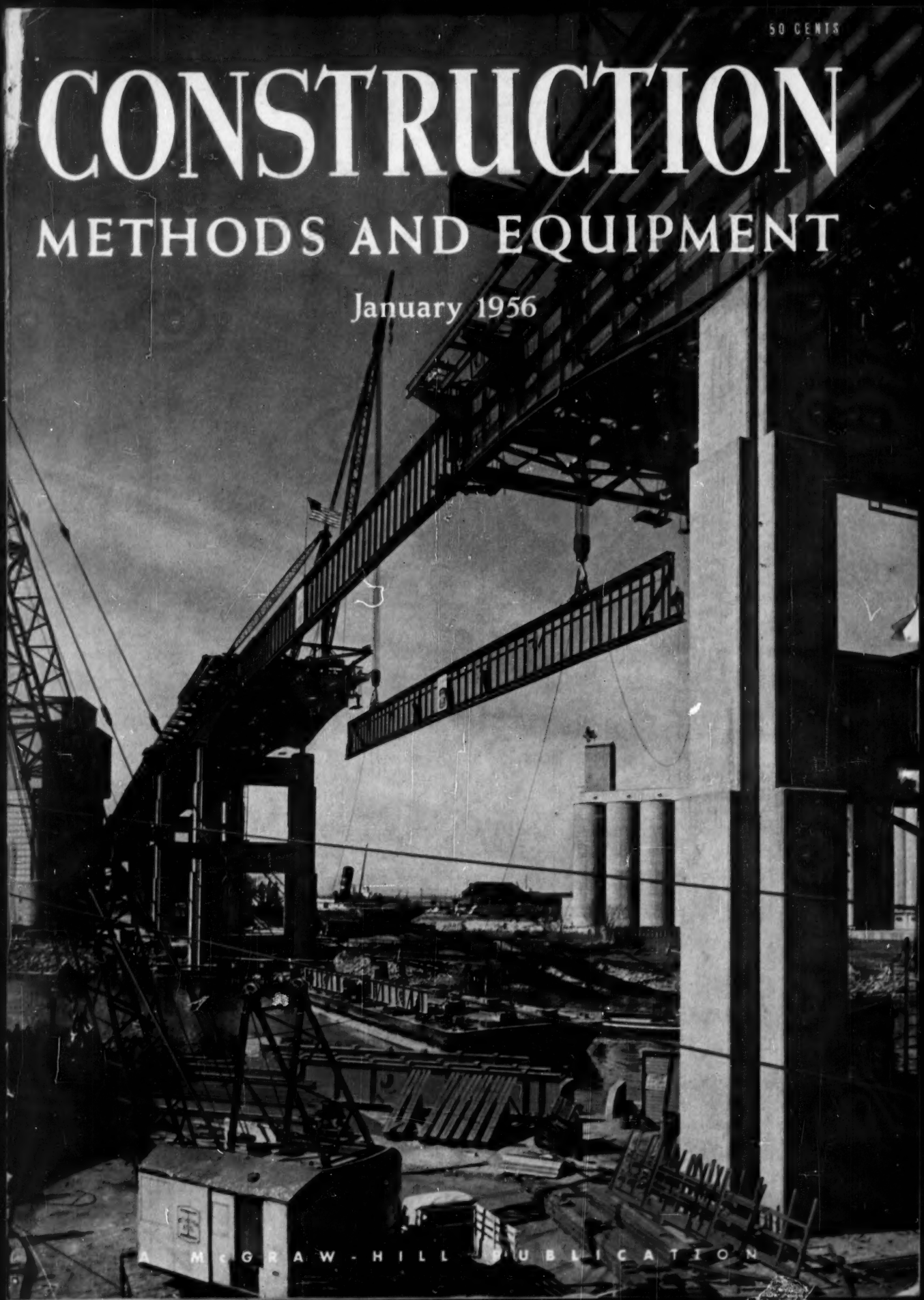
50 CENTS

CONSTRUCTION METHODS AND EQUIPMENT

January 1956



A McGRAW-HILL PUBLICATION

"WE LIKE *Yellow Strand* VERY MUCH.

It outlasts other rope."

says:

Edward S. Mando, Contractor, Erie, Pa.

Moving the 72", 5-ton section of concrete pipe into ditch with special hook and pin arrangement welded to shovel. Yellow Strand Wire Rope stands up to heavy load, resists kinking, remains flexible.

This storm sewer contract specifies 11,000′ of storm sewer, including 3,000′ of 72″ concrete pipe. Sections of the concrete pipe weighed well over five tons each . . . this is reported to be the heaviest job of its kind ever to be done in Erie area. The pipe was laid by the same backhoe that dug the trench, and to handle the load, the shovel had to be specially counterweighted.

Edward S. Mando, Erie contractor, knew that he'd need tough, abrasive-resistant and flexible wire rope for the job. He specified Broderick & Bascom Yellow Strand. Speaking from his experience on this contract and many other jobs over the years, he says, "We like Yellow Strand very much. It outlasts other rope."

On the heaviest jobs . . . on the most rugged and demanding wire rope applications throughout the world, you'll find B & B Yellow Strand working as a vital and productive link between the machine and the material being handled. Make sure this link doesn't become a bottleneck for your production. Specify Yellow Strand next time you order wire rope.

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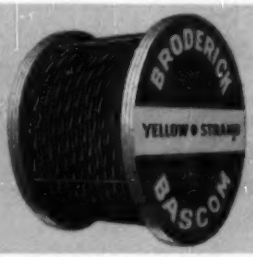

B.F.Goodrich

How All-Purpose tires save 25% on tire costs for concrete company

HAMILTON CONCRETE PRODUCTS, INC. manufactures and delivers all types of concrete block and cast stone in Chattanooga, Tenn. Delivery trucks work 10 hours a day, 6 days a week, must travel over rocky, rutted construction roads. Tires could be quickly chewed to pieces, skyrocketing costs.

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B. F. Goodrich builds the All-Purpose with a tread that's up to 67% *deeper* than that of a regular tire. This extra, tough rubber defies rock cuts. Curved cleats give positive pulling power in forward or reverse. And in sizes 8.25 and larger 2 extra breakers guard against shocks and bruises.

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Specify B. F. Goodrich tires when ordering new equipment

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CONSTRUCTION

Volume 38 Number 1 **METHODS** Established 1919

AND EQUIPMENT

January 1956

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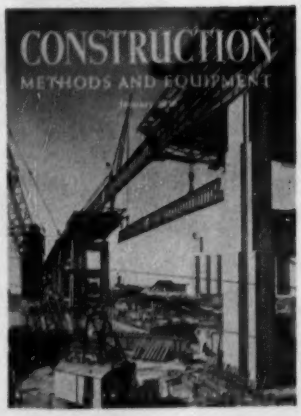

On the Cover

Bethlehem Steel Co.'s 115-ton stiffleg travelers lift 208-ft, 167-ton girder to close last gap in Buffalo, N.Y., bridge. American stiffiegs carry 115-ft booms, are powered by Clyde and Lambert three-drum hoists with Waukesha engines. In foreground, 50-ton Lima crawler with 120-ft boom waits to pass up lighter floor steel. Bethlehem is sub to Bates & Rogers Construction Corp.

CONSTRUCTION METHODS AND EQUIPMENT was founded in 1919, under the name of SUCCESSFUL METHODS, by the Manufacturers Publicity Bureau, Inc., of Chicago, representing a group of non-competing manufacturers of construction equipment. Charles B. Thomas, editor of the first few issues, was succeeded by William Jabine.

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Robert K. Tomlin was appointed editor of CONSTRUCTION METHODS in January 1938, was succeeded by Waldo G. Bowman in January 1946, by Harold W. Richardson in February 1949, and by Henry T. Perez in June 1954.

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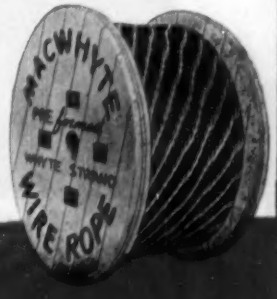

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Pay Dirt in This Issue

January, 1956

Dirt Flies on Massachusetts Turnpike 52

Slowed by three floods, contractors now turn on the speed to keep this big construction job on schedule.

Roof Slab Serves as Truck Road 58

Transit-mix trucks roll over first half of roof slab to pour the second half and so reduce concrete handling costs.

Flexible Plant Pours Out Aggregate 60

To supply some of the St. Lawrence Seaway-Power projects, joint venture plant produces up to 1,000 tph.

Caisson Builders Conquer Mississippi 68

Dravo Corp. is sinking some of the largest and deepest caissons ever built in tricky riverbed at New Orleans.

Paving . . . How to Get the Best Results 85

Last of a series of articles on bituminous paving tells how to select the most economical mix for any job.

Simple Forming is Key to Prestressing 102

Girder forms that are easy to handle, and high-strength bars that stress quickly, pay off on overpass job.

Portable 70-Ton Shores Support Pier 110

Easy-to-build shores simplify the replacing of rotting piles with caps and pedestals at New Jersey pier.

U-Shaped Dozer Blade Digs Clay 127

Blade goes into service on Chicago's Congress St. Expressway to handle clay subbase where scrapers bogged.

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NEXT MONTH

CM&E's series on paving techniques continues with the first of several articles on concrete paving written by engineers of the Portland Cement Association. Next month's article will discuss preparation of the subbase.

(Advertisement)

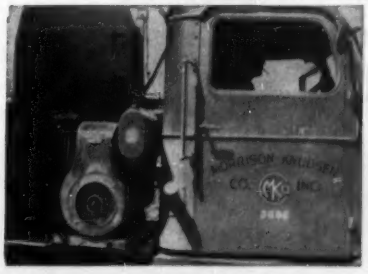
Gorman-Rupp Pump WINS PRAISE in Yuma Desert Project

In the Yuma desert section of Arizona 65 miles of lateral canals are under construction for the United States Bureau of Reclamation. The Morrison Knudson Co., Inc. is the contractor for the project.

These interesting on-the-job photo shots give a graphic picture of the operation. The inset close-up shows a Gorman-Rupp two inch, high capacity, centrifugal pump mounted on an F.W.D. Truck. This pump was used to transfer mixing water from the 3000 gallon transport unit, shown in the lower picture, to the paver on lining operations.

The fact that this pump had been in use for about a year and a half and during this entire period had given maintenance - free service demonstrates Gorman-Rupp dependability on the toughest jobs.

Gorman-Rupp Model 3208



Close-up of pump on truck

Typical view of Bureau of Reclamation Project in the Yuma Desert.

The river pours in — cofferdam piles spring leaks — men take risks or work is held up by flood water.

Dependable pumps are of vital importance, working side by side with the men, shift after shift, day in, day out.

To meet target dates, concrete pouring must be non-stop, trucks must move, the job must hum! Keep pumping and you do it.

Make sure — put Gorman-Rupps on the job *before* you have trouble. Our plain language guarantee is backed by a long record of proven performance *On-The-Job.*

**Ask for Bulletin and the Guarantee*

NOTES FROM THE FIELD

At the Sandusky River bridge on the Ohio Turnpike Gorman-Rupp pumps worked around the clock with men on 3 shifts. At times they pumped 3 weeks continuously, 24 hours a day and no trouble.

THE GORMAN-RUPP COMPANY
MANSFIELD, OHIO

Announcing...

THE NEW ATHEY PR-15 REAR DUMP TRAILER

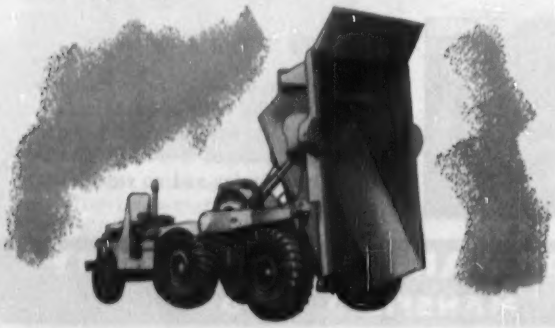
SPEEDS TO 31.3 MPH provide high production at the lowest possible cost. No idle shovels or wasted time. More loads per hour, more material hauled per day.

15.6 CU. YDS. (22 TON) CAPACITY — matched design of the tractor and trailer assures top performance — utilizes full tractor capabilities.

FAST 12 SECOND DUMPING keeps units producing — earning more money. Body raises 60° to dump any load quickly and surely. Spreading is easy with positive operator control of the dumping angle. High speed pump flow control valve and double-acting cylinders all team up to give maximum efficiency.

TURNS IN 37' — facilitates work in narrow cuts and speeds spotting under shovel. Keeps cycle on a profitable basis, eliminates high cost maneuvering.

POWERED BY CAT 186 HP DW15 TRACTOR and interchangeable with the No. 15 Cat Scraper. Tires on the tractor and trailer are interchangeable. Trailer tires, wheels and brake drums are also interchangeable with the No. 15 Scraper for greater economy.



HYDRAULICALLY-CONTROLLED THROUGHOUT — positive, dependable. One lever for dumping. No complicated cable arrangements or downtime for costly cable replacement.

EXCELLENT WEIGHT DISTRIBUTION with 37% on the tractor drive wheels. Traction assured in the toughest footing with big 21:00-25, 24 ply rock-type tires on the trailer and tractor drive wheels.

RUGGED AND DEPENDABLE, made of premium quality steels by specialists in the tractor-trailer field. Over 32 years of know-how and field experience stand behind the PR15.

The PR15-DW15 team is designed for high production at the lowest cost. It has many advantages over other types of hauling units. The wide mouthed body is an easy target. A low loading height increases shovel efficiency. The low center of gravity permits maximum speeds on the haul and around tight turns.

Safety is built in with big powerful brakes. Positive operator control on the edge of the fill with independent braking of tractor drive and trailer wheels. Handling is easy and sure.

All these features mean more profit on every job where the PR15-DW15 team is working — loading more, rolling faster, dumping quicker. Check your Athey-Caterpillar Dealer for all the facts. Find out how you can cut your hauling cost with the new PR15. *Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.*

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—more than any other make of SHOVEL · CRANE DRAGLINE or PULLSHOVEL

and remember

- Well over 100 Northwests—more than any other make—on the New York Thruway.
- Over half the shovel equipment on the West Virginia Turnpike was Northwest.
- Over 60 Northwests on the Ohio Turnpike.
- Over 20 Northwests on the Maine Turnpike extension.

attests to the acceptance of Northwest equipment when output and dependability are at their greatest in importance.

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1503 Field Bldg., 135 South La Salle St.,
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A new Northwest 80-D, one of the latest of the 22 Northwests that have been owned by the Elmhurst Contracting Co., of Corona, L. I., New York. Elmhurst is one of the many Northwest users on the Massachusetts Turnpike.

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If you're not yet using T5X we suggest you find out, as Capt. Rozich did, how this *amazing* purple oil can save time and money for you, too.

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Construction News from Washington

Washington, D.C.
January, 1956

Government opens door to smaller firms

New standards for all government buildings—office buildings, warehouses, post offices, court houses and the like—give more general contractors a chance to bid and win contract awards.

The new set of rules, announced last month, was adopted after a year's study by a committee of architects, engineers, contractors, and building managers. Architects and design firms working on new government projects must follow these rules.

Here's one important change: The prime contractor is required to perform with his own forces only 12% of the dollar value of the contract. Up to now, he has had to perform at least 25% with his own men. This means that many contractors who don't have the organization to meet the 25% rule now can bid for a job and subcontract as much as 38% of it.

Government officials expect this to attract more bidders on most of the buildings jobs coming up.

Lease-Purchase Awards begin

The government's lease-purchase building program—which will result in as much as $300 million of new construction in the next couple of years—gets going this month.

First bid invitations are just coming out. Congress has approved $105 million of projects. Another $200 million, at least, are being prepared for Congressional okay.

The buildings are going up in scores of cities and towns all over the country; jobs range from $50,000 post offices in many small towns to a multi-million dollar customs house in New York City.

The new building standards (see above) apply to all these projects except single-purpose post offices, which are being handled by the Post Office Department.

Besides lease-purchase, the Post Office plans to lease more than 500 small buildings this year—all of them specially built to department specifications. Total cost of construction is estimated to be $30 million or more.

Flood control comes to life for New England

A batch of new flood control dams for New England is the Administration's answer to the devastation brought to the area last summer and fall.

The Administration wants seven new projects—five dams and a

Continued on next page

local channel project in New England, one dam in Pennsylvania.

The planning for these projects is about complete. Once Congress gives the go-ahead, bid invitations can go out quickly. All told, it's expected the projects will cost about $50 million.

Bid-shopping bill stands a chance

General contractors face a tough fight trying to beat back the drive of the specialty contractors for federal legislation on so-called bid-shopping.

The Senate has already approved a bill requiring each bidder on a federal project to list in his proposal the names of the specialty subcontractors who would work on the job if he got the contract. Subs listed would then have to get the jobs. The House will take up the bill soon.

General contractors and government officials say such legislation would hamstring the prime contractor by limiting the authority he needs to meet his responsibility. Government officials may advise President Eisenhower to veto the bill if it gets to his desk.

Public housing and urban renewal

Bids on about 100,000 units of public housing are in prospect this year.

Slight financial hitches developed last year but are expected not to be a problem this year.

Odds are good that Congress will approve at least 35,000 units per year to keep the program going.

Urban renewal—the Republican program designed to broaden slum clearance to get more private re-building—should produce a growing volume of contracts this year. A number of cities already have complied with the rules for getting government aid. Congress is expected to amend the legislation to make it even easier.

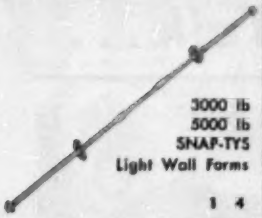
Already some 90 sites are being prepared; construction has begun on 20 additional projects. More than $900 million of construction is involved. Federal funds are available to produce some $5 billion of construction by private redevelopers and local governments.

Military construction will go up

Defense Department officials estimate privately that federal spending for construction of U.S. military works will rise to more than $2 billion this year. That is $200 million more than last year. And it would make 1956 the biggest year for military construction since World War II. About 75% of the spending will be within the U.S.; the rest will be overseas. In addition, the increased rate of awards probably will carry over into 1957.

RICHMOND REFERENCE GUIDE FOR YOUR CONCRETE CONSTRUCTION NEEDS

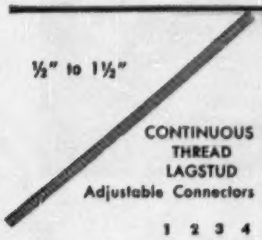
CUT OUT AND FILE



3000 lb
5000 lb
SNAP-TYS
Light Wall Forms
1 4

½" to 1½"
2 STRUT
TYSCRUS
Heavy Wall Forms
1 2 3 4

1" to 1½"
4 STRUT
TYSCRUS
Mass Concrete Forms
2 3



½" to 1½"
CONTINUOUS
THREAD
LAGSTUD
Adjustable Connectors
1 2 3 4

½" to 1½"
TYLOOPS
Form Anchorage
3

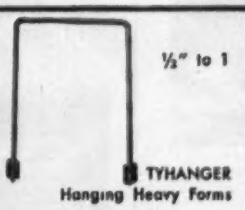
⅜" to 1½"
SCREW ANCHORS
AND BOLTS
Anchorage to Concrete
2 3

1¼" - 1½"
WHIRL-WIND
ANCHORS
(No Slip)
Lift Form Anchorage
3

¼" to ¾"
THREADED INSERTS
Fastening to Concrete
1 2 3 4

⅝" - ¾"
PEERLESS WEDGE INSERT
Shelf Angle Support
1

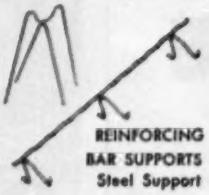
SNAP-TY
HANGER
Hanging Light Forms
1 4



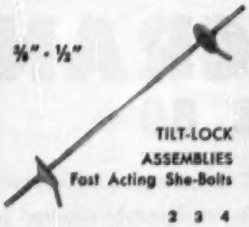
½" to 1
TYHANGER
Hanging Heavy Forms
1 2 4

HANGER
FRAME SCREED
Form Hanging
and Screeding
2

ADJUSTABLE
SCREED CHAIR
Screeding Slabs
1 2 4

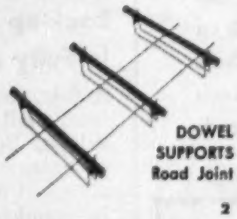


REINFORCING
BAR SUPPORTS
Steel Support
1 2 3 4



⅜" - ½"
TILT-LOCK
ASSEMBLIES
Fast Acting She-Bolts
2 3 4

TYFRAME
Stadium Forms
1

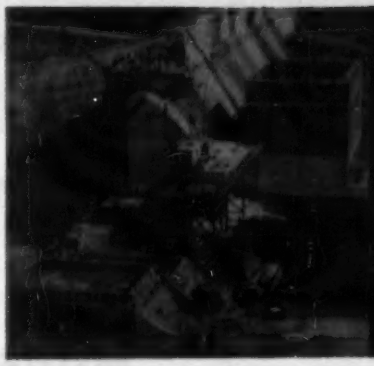


DOWEL
SUPPORTS
Road Joint
2

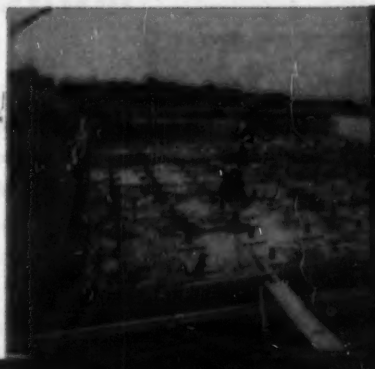
LOAD
TRANSFER
ASSEMBLIES
Airport Slabs
2

buildings ①

roads & bridges ②



tunnels & dams ③



water & sewage PLANTS ④

The above is a partial showing of the 358 items contained in the Richmond line of engineered concrete form-tying devices, anchorages and accessories—the largest line in the field. All items are designed for specific uses, not only for the fields pictured above but also for the building of *stadiums, grand stands, auditoriums, retaining walls, curtain walls, silos,* etc.

Whatever your concrete construction needs, contact Richmond. Richmond products are engineered to give you extra strength, ease of handling, utmost economy. Write for complete catalogue. If you have a specific problem, Richmond's Technical Division or field service men will be glad to submit drawings, engineering data and proposals. Address:

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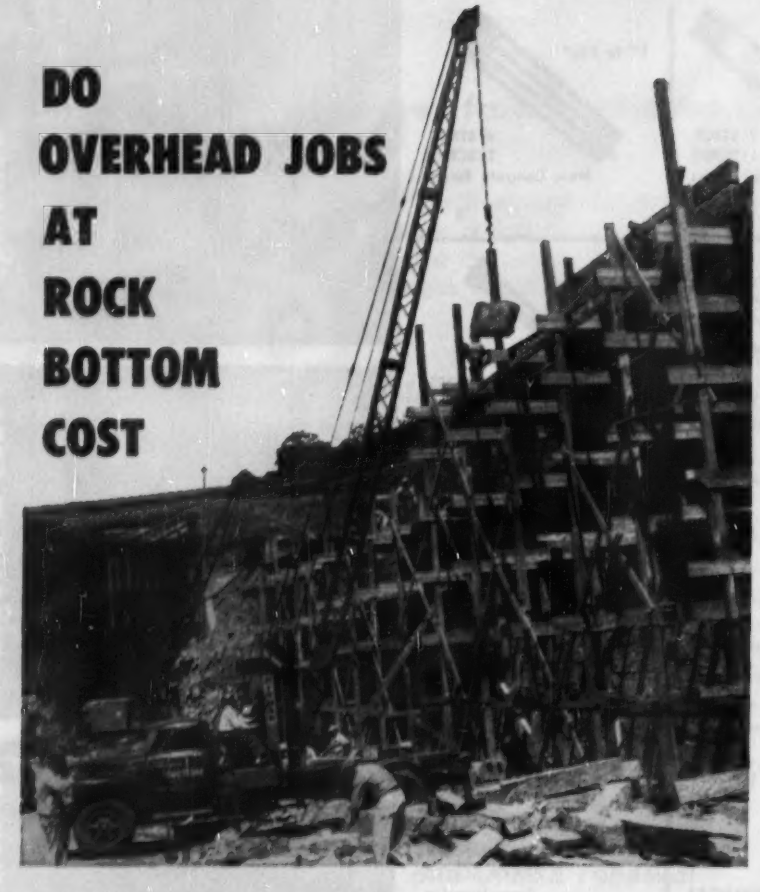

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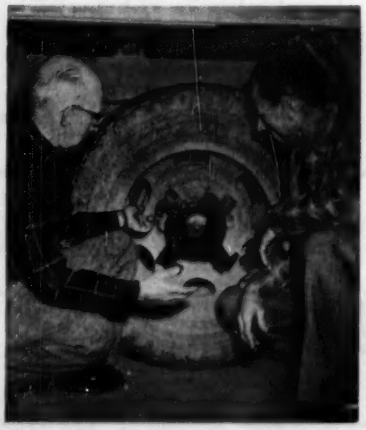
Job Talk . . .

Bar Splits Bags over Skip

A sawtoothed bar bolted across the skip of a concrete mixer proved to be a good labor saving device on a gas pumping station job in Pennsylvania. Fish Engineering Co. of Houston, Texas, set up two Jaeger 16S mixers to supply concrete for a big foundation pour. To charge the skips, workmen simply threw bags of cement on the bar, which cut them cleanly in half.



Back-up Alarm Is Fully Automatic

A 6-in. metal bell surrounded by four small hammers has been developed by two construction men to operate as a vehicle back-up alarm. It mounts on the axle hub, is completely automatic, and requires no electrical or mechanical connections. As the wheel turns backward, one hammer at a time strikes the bell. Small springs prevent the hammer from riding on the bell. They also keep the hammers from striking the bell when the wheel turns forward. Credit for developing the device goes to

(Continued on page 16)

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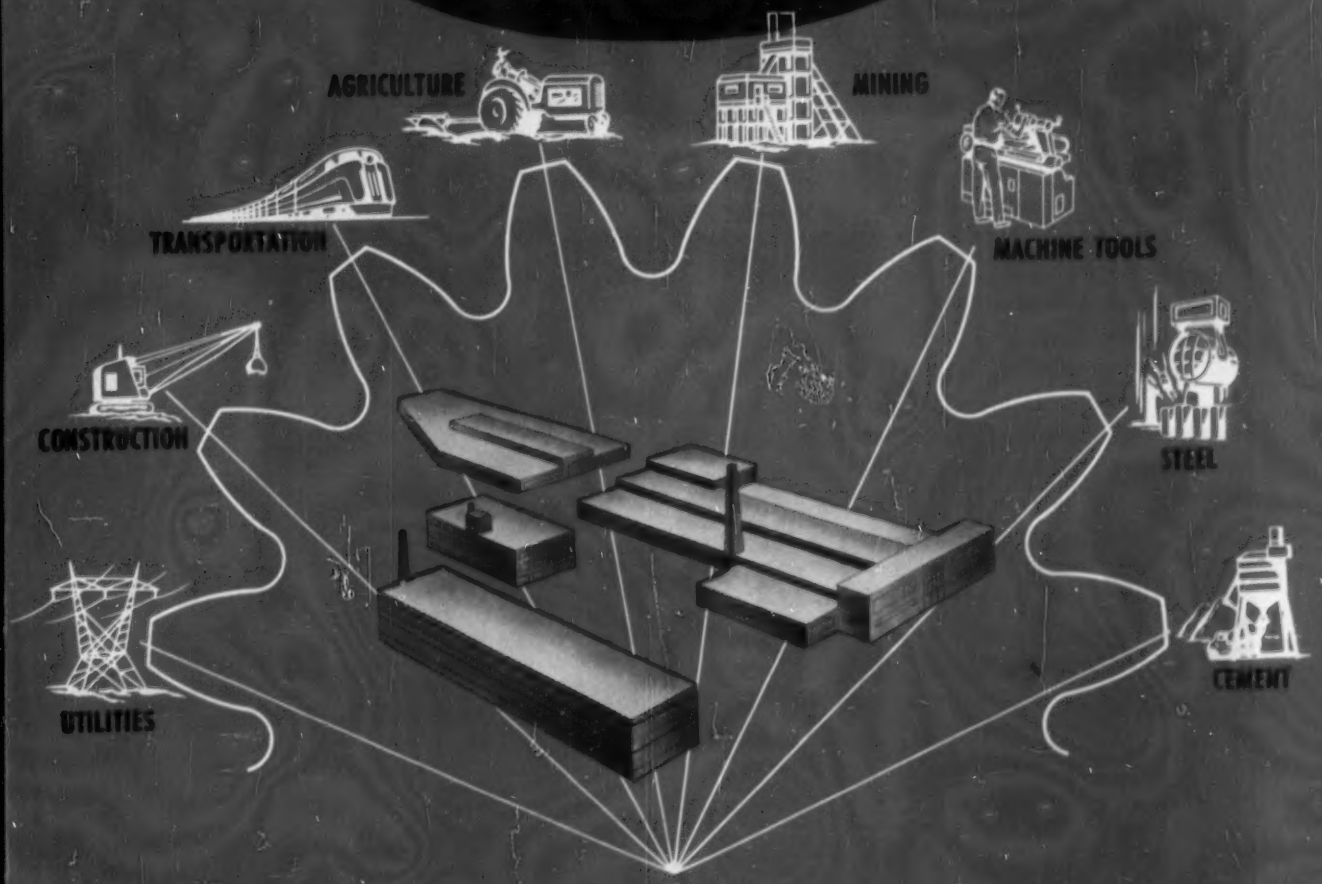
Long the Choice of American Industry



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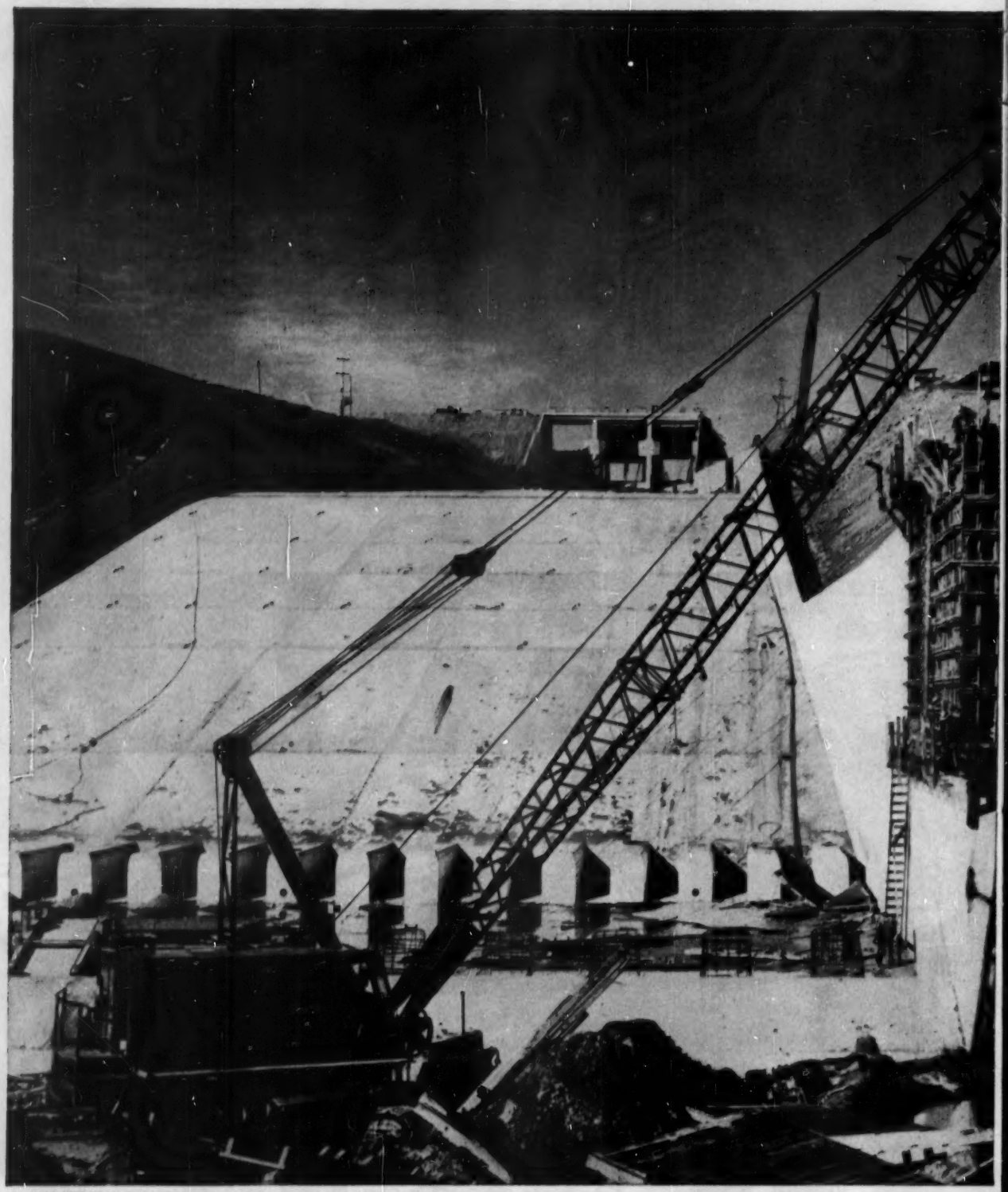

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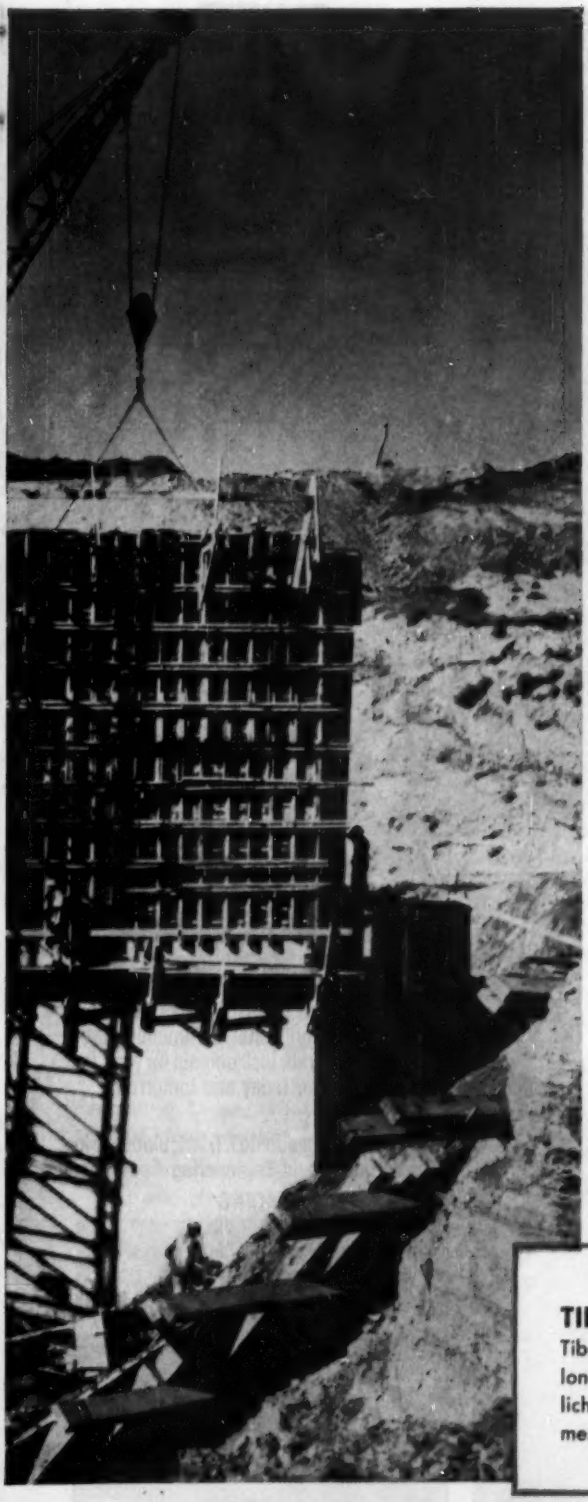

How Texaco helps beat schedules

JAMES & WUNDERLICH, contractors, handle all construction work at Tiber Dam, Montana. To keep their huge task force of equipment operating dependably and economically, they rely on Texaco for all lubrication. Reports Mr. F. A. Bleecker, Project Superintendent:

"To keep our equipment on the job constantly, we need really effective lubrication—and get it with Texaco. Our diesels, for example, deliver top-notch performance with *Texaco Ursa Oil Heavy Duty*. In addition, we've improved preventive maintenance procedures and cut costs by following the Simplified Lubrication Plan recommended to us by a Texaco Lubrication Engineer. Thanks to Texaco, we get the high equipment efficiency necessary to keep the work ahead of schedule."

Before you start your next project, ask a Texaco Lubrication Engineer about the Texaco Simplified Lubrication Plan. He'll show you how — with *no more than six Texaco Lubricants* — you can handle *all* major lubrication, save time and money, eliminate errors.

Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

TIBER DAM, crossing the Marias River Valley 13 miles below Tiber in Northwest Montana, will be 205 feet high and 4,300 feet long when completed. Guy H. James Construction Co. and Wunderlich Contracting Co., contractors for the project, lubricate their equipment with Texaco exclusively.

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FOR ALL CONTRACTORS' EQUIPMENT

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WRITE FOR ILLUSTRATED BULLETIN
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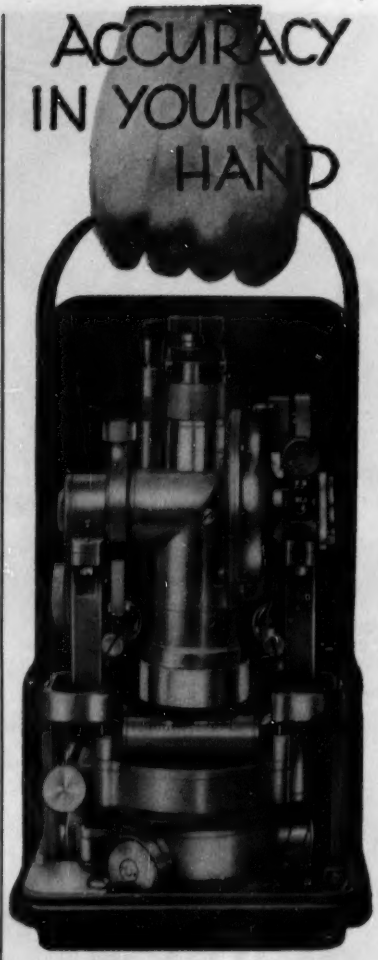
JOB TALK . . . Continued from page 12

Max von Radics and William Bookwalter of Miller Construction Co., Anchorage, Alaska. The unit is now undergoing tests by the Corps of Engineers, U. S. Army.

Hole Puncher Speeds Wellpointing

Layers of shale slowed wellpoint placing to a standstill at a big shopping center job in Paramus, N. J., until the contractor brought in a hole puncher. The 2-ton unit quickly cut its way through the stubborn material to reach water-bearing strata. Developed by Moretrench Corp., the puncher con-



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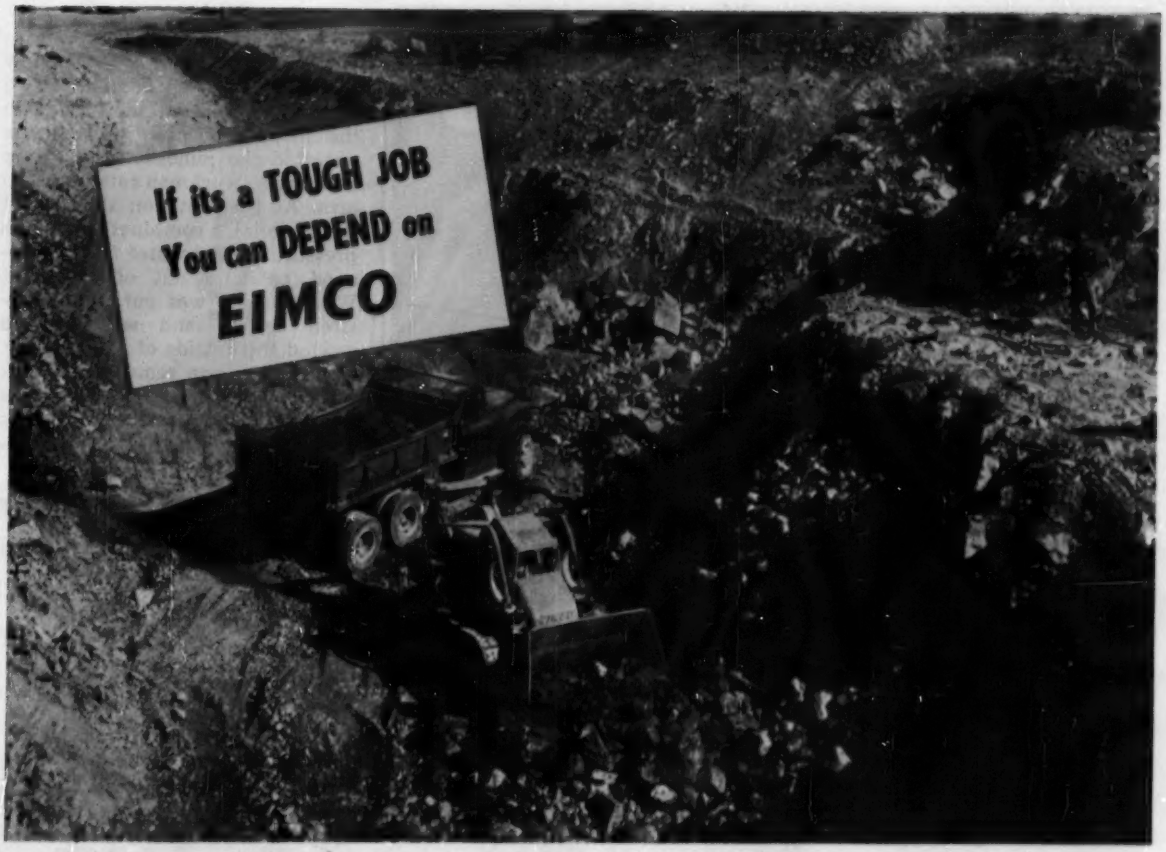

Hard, Tight, Blocky Tungsten Ore Loaded by Eimco Tractor-Excavator

Location: Nevada
Haulage Equipment — 2 - 20 ton trucks
Trip — 2,000 feet each way
Present Production — 200 tons per hour
Machine Capacity — Idle 40-50% of time waiting for trucks
Operation — Machine loads 20 ton trucks from pit 3 mins. each, loads 20 ton trucks from stock pile 1½ mins. — also used to load waste from around mill, loading concentrates and as a prime mover for heavy machinery and supplies.

Report — The solid rough bottom in the pit is hard on tracks and rollers but to date no troubles have been reported. Operators say "It's much better than a shovel because there's no swing and I don't have to be square with a truck to load it. I can load from almost any angle. It's really built, you can't hurt it." Owners say — "It's doing all that was said for it and it's a most versatile machine. It has a thousand and one uses. We use it for many different jobs besides ore excavation including loading waste at the mill, for fill around the camp, loading concentrates and even as a come-a-long when handling heavy machinery and supplies."

This mine has four other Eimco loaders underground and know that Eimco's are built to handle the tough jobs.

Eimco's are made simple for easy handling and easy maintenance. All parts on the Eimco are alloy steel, cast or fabricated. The Eimco 105 Tractor-Excavator is designed for years of service. Many reports show 30%-100% longer service life with an increase in production of 25% to 400% over comparable equipment.

Before you buy — do yourself a favor — compare the Eimco with any other equipment.

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B-178

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Photo Courtesy of Thew Shovel Co.

Photo Courtesy of Link Belt Co.

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Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale, Fla.

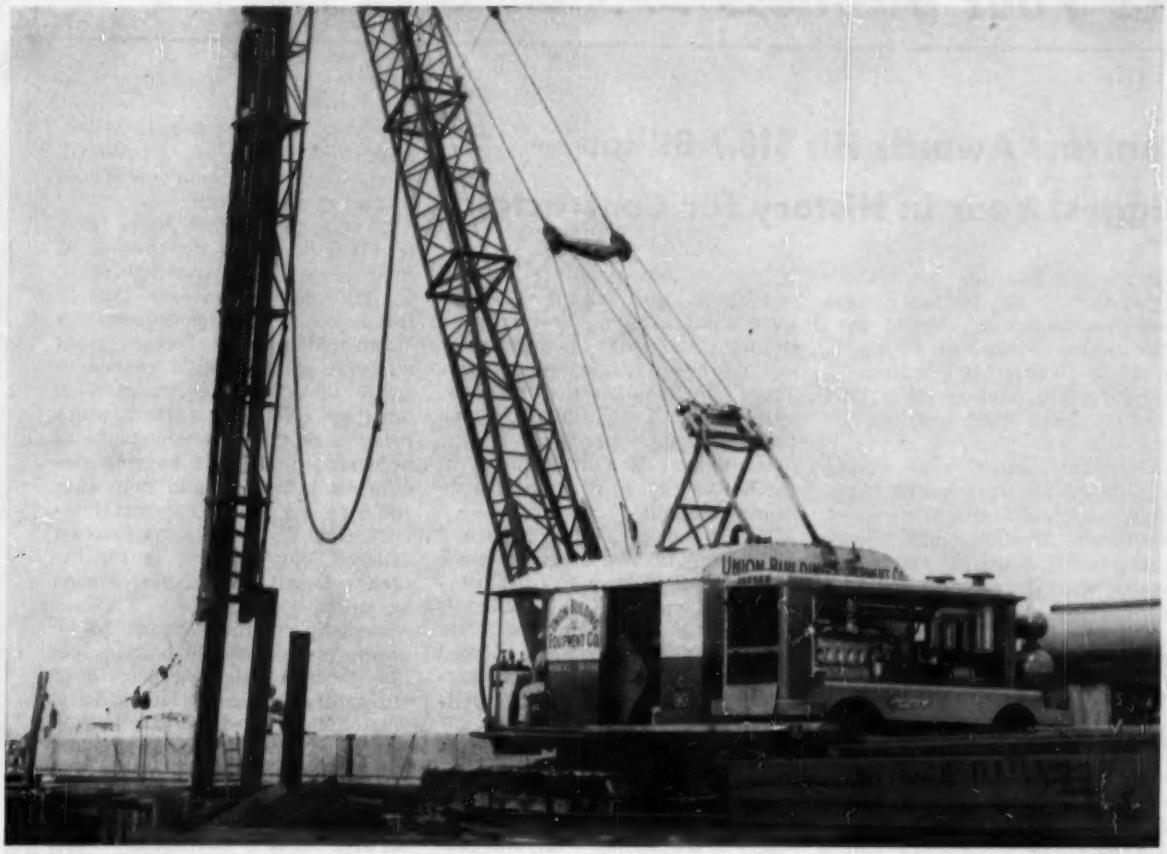
JOB TALK . . . Continued from page 16

sists basically of a 2-ton hollow pipe with teeth on one end and a removable head on the other. On the shopping center job, a crane operated the puncher like a drop hammer as workmen rotated a bull arm. As the teeth on the tip cut the material, a combination of high pressure air and water forced loosened particles out of the hole. When a hole was cut to the desired depth, sand was dumped around the outside of the puncher. Its top was then removed, a well-point lowered inside, and the puncher pulled out. The job calls for several thousand feet of well-points.

Job-Made Rig Breaks Concrete Pavement

A 1-ton hammer operated on the back of an old truck by a power winch made an excellent pavement breaker for Hallett Construction Co. of Crosby, Minn. Hallett had the job of removing 6 and 8 in. concrete runways at Offutt Air Force Base in Nebraska. To do the job economically, the contractor developed his own rig. He first added a special transmission which permitted the old truck to travel very slowly. On the back of the truck he mounted a simple pile-driver leads. The big advantage is one-man operation. Once the operator aims the truck in the right direction, he is free to go to the rear of the rig and control the hammer. Hallett reports that the unit breaks 350 sq yd of pavement per day.

R. C. McConnell is project superintendent for the contractor, and Col. T. J. Hayes is District Engineer for the Corps of Engineers.



COMPLETE PILE DRIVING UNIT ON CRAWLERS: To obtain a minimum safe bearing of 75 tons, 12 WF 74 piles were driven to average 170′ depth by splicing 65′ lengths. The compact driving rig was devised because of the limited area adjacent to heavy traffic. Union Building & Construction Corp., Passaic, N. J., contractor.

Jaeger Rotary fits tight spot on Turnpike

Widening the New Jersey Turnpike between Secaucus and Ridgefield involved driving piles to 170′ depth in a very limited working area adjacent to heavy turnpike traffic. The job was done "with excellent results" by mounting a Jaeger 600 "Roto" compressor on the crane, the Jaeger rotary being compact for mounting *and easily able to maintain constant full pressure in the Vulcan No. 1 hammer by direct feed.*

Contractors who use Jaeger Rotaries for pile driving frequently describe their operation as "*smooth as steam*". This is because Jaeger engineers have devised faster-acting, closer-regulating controls to hold pressure constant under fluctuating demands. All speed modulation is smooth and stepless. There is never any over-run or racing of the engine. Your Jaeger "Roto" also operates at slower speeds than other rotaries, using less fuel and undergoing less wear. For complete data, call your Jaeger distributor or send for Catalog JCR5.

Jaeger Roto Air-Plus® "600",
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Contract Awards Hit $18.7 Billion — Biggest Year in History for Contractors

Heavy construction contractors closed their books on the biggest year ever in dollar value of contract awards. Volume for 1955 adds up to a record $18.7 billion, a thumping 30% increase over 1954 and 19% above 1952's previous all-time high.

The year brought new records in contracts for waterworks, highways, earthwork and waterways, commercial building, and private mass housing. Sewerage and bridge awards were the second largest for any year.

Sharpest rises for the year came in earthwork and waterways, which shot up 61% to $546 million, and private industrial building, which climbed 57% to just shy of nearly $3 billion in awards. Private mass housing chalked up a 45% increase over 1954 with more than $6.1 billion.

Waterworks contractors had a 28% jump in new business with contracts hitting $314 million, well above any previous year. Sewerage awards rose a moderate 4% to $402 million. Highways increased 11% to top $2.1 billion, and bridge awards were up 7% to $545 million.

Sparked by the continued strong trend to shopping centers, commercial building contracts rose 17% to a new all-time high of nearly $1.7 billion.

The only soft spot in heavy construction last year was public building. Public housing dipped 3%, and other types of public building were off a slight 1% in the overall.

School contracts were disappointing. They increased only 1% or so over 1954 volume.

Materials Are Tight, But Some Shortages Fading

Last year's record volume of new work put a severe strain on available supplies of many key construction materials. Most widespread problem was the tight supply of steel and the slowdown of steel deliveries caused by the log-jam of orders. This was particularly apparent in structural shapes and plate, but reinforcing bars were tight in some areas. Other shortages cropped up frequently and were serious in some cities. These included cement, glass, gypsum board and lath, Douglas fir lumber, and plywood. Equipment deliveries slowed down to further hamper contractors' scheduling problems.

Critical shortages of steel and glass were blamed for large-scale unemployment among several construction trades in the Philadelphia, South Jersey, and Delaware areas. Tight steel was also blamed for some construction unemployment in the New York metropolitan area.

Prices of some materials, particularly Douglas fir lumber, rose in response to shortages. Quantities of cement were imported, especially in the Middle West, and contractors paid a stiff premium to get it.

The steel shortage and slow deliveries are expected to continue in 1956. In fact, the situation may worsen before it gets better. Bethlehem Steel, for instance, promises no delivery on new orders for heavy plates until 1957.

Shortages of some other materials have begun to fade—or at least crop up less frequently during the last couple of months. Part of this is due to a seasonal decline in construction activity which gives materials production a chance to catch up. The big question is whether next year's rush won't bring back the same shortages as occurred in 1955. If housing declines a bit, this could help ease the pressure on many items. However, CM&E's preliminary forecast (CM&E, Nov., p. 16) is for increases in all other types of construction.

Cement supplies appear to be easing up and should become less of a problem this year because of substantial expansion of capacity. The industry added 23 million barrels of capacity during 1955 and this year it will add more than twice as much—56 million barrels. This two-year program represents an over-all 25% increase in cement capacity since 1954. By 1957, cement shortages should end except for scattered tight spots, even allowing for increases over the current record demand.

1956 Outlook: More Records to Fall

Heavy construction contracts will boom to still higher marks this year. CM&E's preliminary forecast is for contracts to increase 5% over 1955's record volume. A roundup of reports on new business prospects during the first six months of this year confirms this forecast.

Industrial building looks to be an outstanding factor in the boom, but shopping centers, highways, and bridges also will contribute.

Housing is the only major weak spot, but even here it's hard to get agreement in some parts of the country. Some experts think tighter credit terms and increased prices will hold down housing; others believe credit will ease and housing will bounce back to the high 1955 rate.

The South is confident that construction will hold at a brisk pace and possibly increase during the first six months of 1956. That's the consensus of reports from Alabama, Georgia, Mississippi, Louisiana, and North Carolina. Tennessee's forecast is "reasonably good." The only gloomy note comes from Florida where some authorities feel tight money may hold back housing and some public works.

Industrial building looks very promising in the South. Alabama, Kentucky, Mississippi, and North Carolina are counting on it to keep over-all construction apace of 1955 or even push it higher. Memphis, Tenn., reports an industrial boom, and Mississippi claims the expansion of industry is a major factor in the rising market for new homes. Also helping out in this state will be a gigantic school equalization program which will get underway

D9 MOVES BIG YARDAGE

for MORRISON-KNUDSEN

A CAT* D9 Tractor with No. 9S Bulldozer is the prime earthmoving tool on this Morrison-Knudsen contract in Idaho. The job—relocating 11.37 miles of the Idaho City-Owl Creek road—involves clearing 64 acres and moving 337,000 cubic yards of dirt and rock. One rock cut is 87 feet deep and there are fills up to 30 feet.

With its huge 14-foot 'dozer, capable of handling up to 9 cu. yd. at a blade load, the D9 makes 40 passes, 200 feet long, per hour.

Now that the D9 has proved itself on jobs all over the country, owners recognize it as the top production machine among big tractors. It's the first track-type tractor with Turbocharger. The 286 HP Caterpillar Diesel Engine gives it ample power to match its weight and traction. You have a choice of torque converter or oil clutch drive. And there is "Live-shaft" drive for rear-mounted equipment.

Operators say this big machine is "as easy to handle as a small tractor." Easy to service, too. The exclusive, trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are among the reasons why.

Your Caterpillar Dealer can give you some eye-opening facts about the economy of the D9 for big yardage jobs. Ask him for a working demonstration today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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A MOVING EVENT: 241 TONS OVER SECONDARY ROADS!

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More Craning, Less Straining is another benefit enjoyed by the Frank W. Hake firm, using Cities Service products. Trucks, tractors, trailers, hoisting engines—all 36 pieces of mechanized equipment get Cities Service care.

Carrying a 91-ton transformer over secondary roads is just routine work for this mammoth rigging unit of the Frank W. Hake rigging firm, Philadelphia, Pa.

The nation's largest acceptable means of land transportation, the unit measures over 106 feet long, 12 feet wide, 17½ feet high and weighs 150 tons just by itself!

All told, that's 241 tons on the move, thanks to the power and lubrication of Cities Service petroleum products!

Why Cities Service? Partner Glenn F. Hake puts it this way: "When you work with the biggest piece of equipment, you've got to choose the petroleum products that do the biggest job . . . and that's Cities Service. For the past eight years, we've used Cities Service gasolene, diesel fuel, lubricants, and solvents—in *all* our transportation and construction equipment . . . trucks, tractors, trailers, truck cranes, hoisting engines, air compressors, and other equipment too numerous to mention. In fact, we even use Cities Service Fuel Oils to heat our business properties and our homes.

"We can truthfully state, without reservation, that we have had excellent service and performance at all times, and would heartily recommend Cities Service products to others."

If you're interested in Mr. Hake's suggestion, talk with a Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

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Continued from page 20

this year with $7 to $10 million in contracts expected, first of a total program estimated to cost $117 million or more.

Louisiana has new industrial plants coming headed by Kaiser Aluminum & Chemicals $60-million alumina plant at Gramercy. New Orleans has two $25-million shopping centers planned for the West Bank of the Mississippi. Also coming up is the 8,000-ft elevated approach to the Mississippi River Bridge, to cost about $15 million. New Orleans will advertise bids in January for two wharves, part of a $60-million port program.

The trend of industrial plants to the South is much in evidence in Georgia. Projects coming up: Rayonier's $25-million plant at Jesup; Southern Nitrogen's $14-million Savannah plant; and DuPont's $6-million paint factory at Tucker. Schools costing $30 to $40 million will come up, and hospital awards will total $4.2 million. Atlanta construction is expected to equal 1955's high volume.

Tennessee will get its share of industrial building. New Johnsonville expects a start on DuPont's $25 to $30-million pigment plant. Industrial expansion.

North Carolina contractors expect the current boom to continue. Some look for a further increase, but they say a more critical steel shortage might slow things down. A number of industrial plants are set to start this year, particularly in the Greensboro, Charlotte, Burlington and Gingston areas.

The heavy construction boom West of the Mississippi should roll on in the first half of 1956. Colorado's highway construction will be stepped up, and Denver promises to be very active, with industrial, school, office, and shopping center construction.

Nebraska highway work will about equal 1955's $20 million. Omaha contractors see 1956 matching 1955's record first half, with church and school prospects especially strong. The Omaha District Corps of Engineers plans to let $41 million in military and civil works, most of which will be for projects in the Dakotas.

Iowa expects new records this year for most types of construction. Biggest increases are due for: churches, up 15-20%; industrial building up 10-15%; commercial building up 10%; and schools up

(Continued on page 26)

WRIST-LIKE ACTION...

Produces Beautiful Floor Finishes

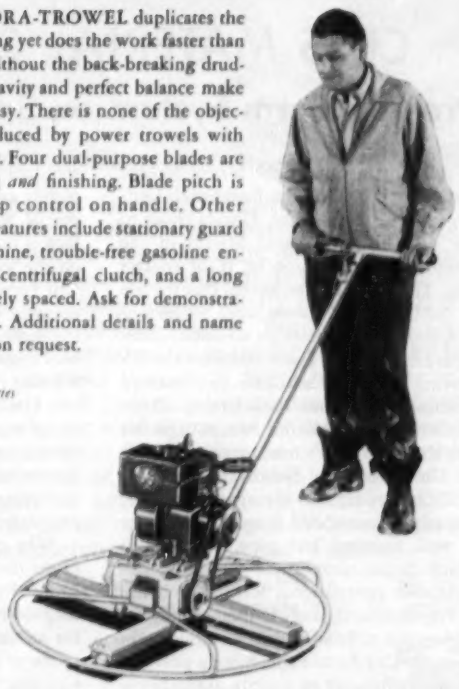
The NEW Kelley

HYDRA-TROWEL

(PATENTS PENDING)

The new Kelley HYDRA-TROWEL duplicates the quality of hand-finishing yet does the work faster than hand-troweling and without the back-breaking drudgery. Low center of gravity and perfect balance make operation amazingly easy. There is none of the objectionable gyrating produced by power trowels with high centers of gravity. Four dual-purpose blades are used for both floating *and* finishing. Blade pitch is adjusted by finger-tip control on handle. Other HYDRA-TROWEL features include stationary guard ring for carrying machine, trouble-free gasoline engine with heavy-duty centrifugal clutch, and a long handle with grips widely spaced. Ask for demonstration and be convinced. Additional details and name of nearest distributor on request.

A few good distributor territories still available.



Kelley also makes the Kelley Compactor for:
- Floating dry-mix topping
- Driving in surface hardeners
- Grinding out surface imperfections.

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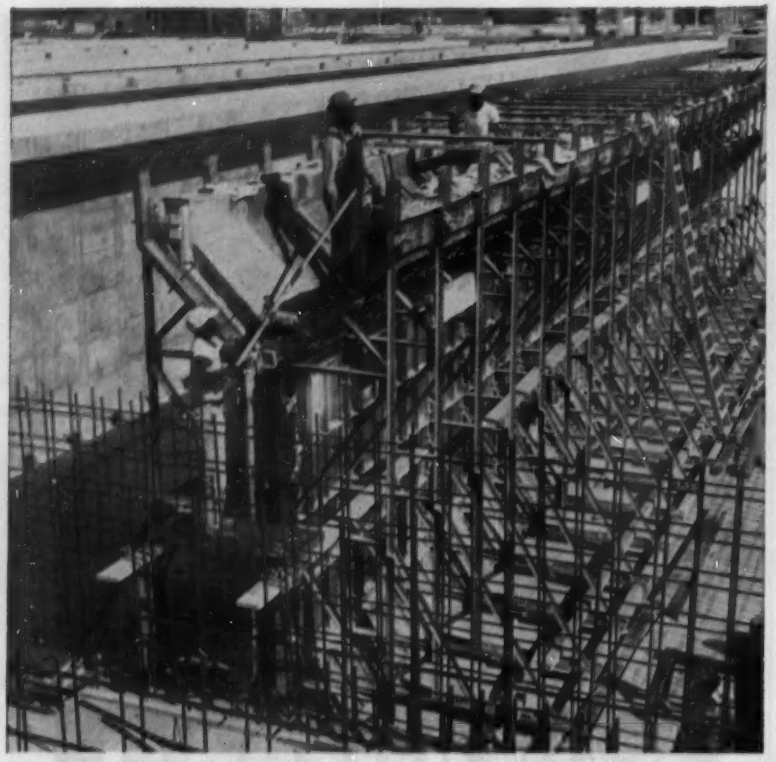


Special Y wall forming system makes for simplified stripping operation. 100% reusability of all materials. Note complete absence of lumber normally required for shoring and bracing on this type of structure.

CUTS MATERIAL COSTS with Pre-Fab Form System on Sewage Plant Job

In the construction of the Miami Sewage Treatment Plant Job the Paul Smith Construction Co., of Miami, Florida chose to use the Uni-Form Panel System in the forming of one million sq. ft. of contact area. The contractor estimated that the use of the Uni-Form System *saved 40 percent in material costs alone.* In addition, faster form erection with fewer men kept the job moving ahead of schedule and reduced estimated labor costs considerably. These fine results were obtained even though this was the contractor's first experience with the Uni-Form Panel System.

This considerable savings in material and labor was realized in spite of intricate Y wall forming and pipe intersections which causes complicated forming problems with conventional forming systems.

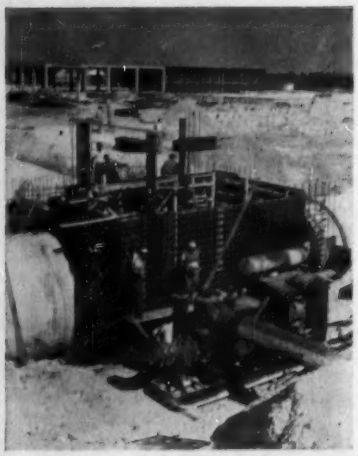
Pre-fabricated, ready to use—completely engineered to handle most forming problems, the Uni-Form Panel System provides such advantages as simple assembly—minimum one side alignment and bracing—automatically accurate wall widths—positive internal spreading—faster stripping and maximum re-usage to give the contractor lowest all around form costs.

Y wall trusses designed to member with standard Uni-Form Panels formed a completely automatic system for handling the special forming problems, and were big factors in the economy and speed obtained on the job. Simple assembly of Standard Uni-Form Panels on the trusses eliminated many of the aligning, bracing and spreading problems usually encountered in Y wall construction. In addition to simplified forming the combination system of standard Uni-Form Panels and trusses eliminated many of the problems normally encountered in the stripping of a wall section of this type. The contractor was well pleased with all phases of his forming and stripping operations.

Why not investigate the many advantages the Uni-Form Panel System can bring to you? Write for the Uni-Form Catalog—or better yet, send us a set of plans for an estimate on your next job. Let us prove to you as we did to the Paul Smith Construction Co., that the Uni-Form Panel System can cut your forming costs.

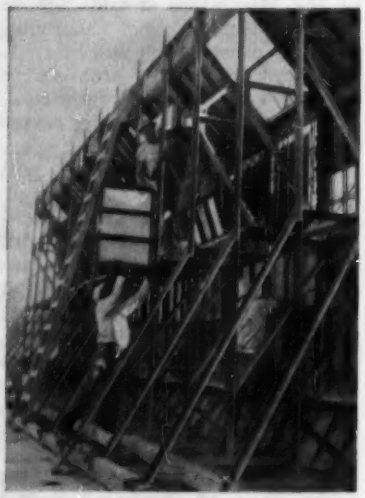
UNIVERSAL FORM CLAMP CO.
1238 N. Kostner Avenue • Chicago 51, Illinois

Branch Offices and Warehouses:
Los Angeles • San Leandro, Calif. • Houston, Texas
Cleveland, Ohio • Baltimore, Md. • Atlanta, Ga.



Intricate forming in restricted areas presented no problem. Uni-Form Panels erected aligned and braced one side eliminated difficulties normally encountered in placement of reinforcing steel. Note Uni-Form Panels around large precast pipe.

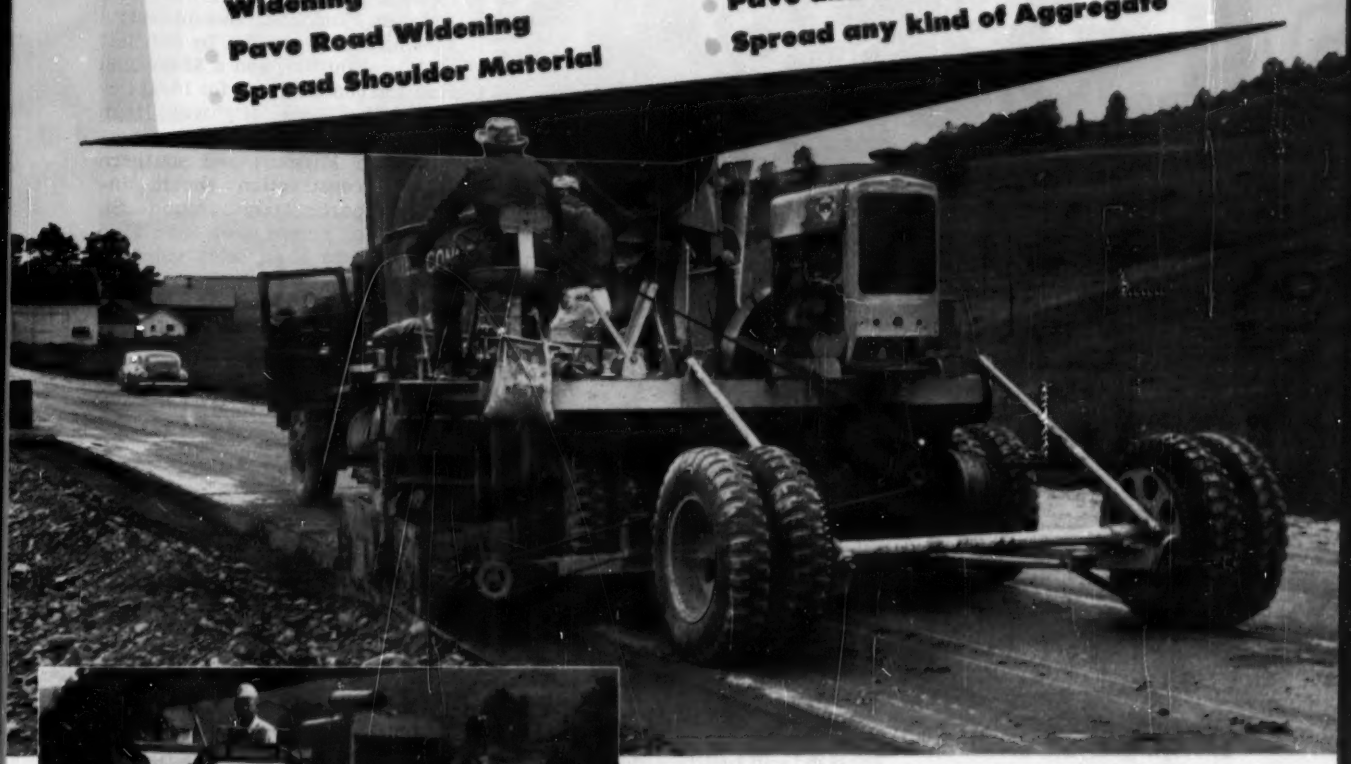
One side aligning and bracing provides clear unobstructed working areas increasing job efficiency.



Y wall trusses incorporated alignment, bracing, shoring and scaffolding requirements.

LOOK at all you can do with a BLAW-KNOX ROAD WIDENER

- Spread Base Course for Road Widening
- Pave Road Widening
- Spread Shoulder Material
- Spread and finish concrete without forms
- Pave and finish Asphalt
- Spread any kind of Aggregate



BLAW-KNOX
Dual Compression Trench Roller

Most flexible and economical trench roller available. Can be accurately adjusted to roll from a minimum width of 20" to a maximum of 39". The two 60" high rolls, used either "dogleg" or tracking each other, provide up to 345 pounds per lineal inch per roll. They can be hydraulically adjusted to compact to depths of 24".

You'll like the Road Widener's ability to handle many different jobs and materials. Its versatility means that you will need a minimum of labor and equipment on any road widening or shoulder job to lower construction costs. Steady high capacity of up to 200 tons per hour keeps jobs on schedule. Tandem drive wheels on all models have power to spare for pushing the heaviest trucks up steep grades. A large hopper, special conveyor belt and hydraulically controlled strike-off gates handle any type of aggregate or asphaltic concrete in widths of 2 to 10 feet. Hydraulic controls permit gradual widening of a strip around curves when laying aggregate or asphalt. Special vibrator attachment available for all models of Road Wideners spreads and finishes concrete without the use of forms.

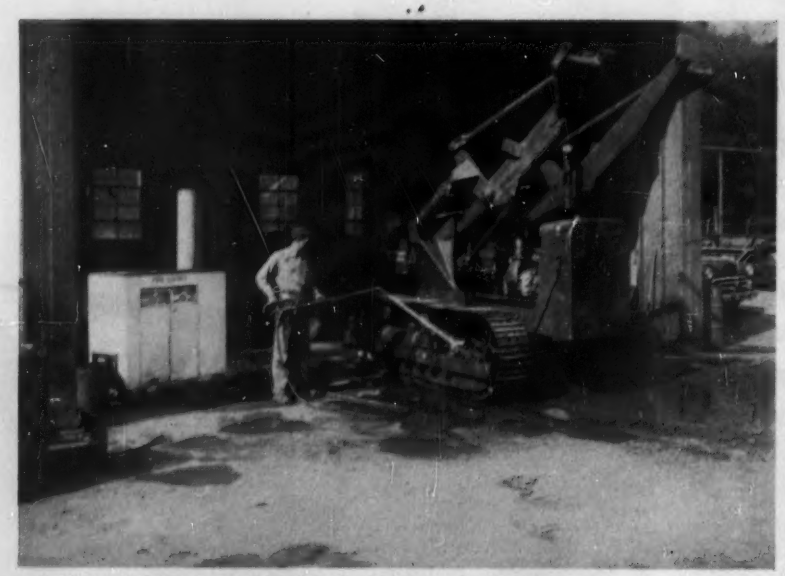
See your Blaw-Knox distributor . . . he can give you complete details on the models 80, 85 and 95 Road Wideners.

BLAW-KNOX

BLAW-KNOX COMPANY

CONSTRUCTION EQUIPMENT DIVISION

Mattoon, Illinois



Malsbary 250 HPC cleaner blasts heavy clay, grease and tar from earthmoving equipment; cleans grease and oil from parts, motors and tracks during overhaul; strips paint from used equipment for Frantz Tractor Co., Inc., Bronx, N. Y.

Look what you can do with a

Malsbary HPC Cleaner

If you own a Malsbary HPC (high pressure combination) cleaner you can use:

1. High pressure hot solution to 300-400 p.s.i. at 325° F. to soften and blast away waterproof greases, tars, corrosive oil and dirt.

2. High pressure cold water to 300-400 p.s.i. for rapid removal of caked mud and dirt, or cold rinsing after steam cleaning.

3. High pressure hot water to 300-400 p.s.i. at 200° F. to melt and remove ice and frozen mud, or to rinse equipment.

4. Low pressure wet steam (15-30 boiler hp.) to degas and clean tank interiors or for general heating and thawing.

5. Low pressure warm water for washing trucks, tractors, etc.

Malsbary 250 HPC completely cleans this shovel in 4 hours.

Cleans Faster Too — because Malsbary HPC cleaners combine pumped hydraulic and steam pressures (an exclusive, patented Malsbary feature), you have a cleaning force and range unmatched by any other steam cleaner on the market. A Malsbary HPC will handle any cleaning job twice as fast as any steam vapor cleaner (regardless of volume), and does most cleaning four to ten times faster. Try it.

You Can Reduce Downtime still further with big Series 300 and 500 HPC cleaners. They operate two or more guns simultaneously, one delivering high pressure cold water, the other high pressure hot solution — a real time saver on big rigs and fleets.

Can your steam cleaner handle all these cleaning jobs? If not, ask your Malsbary dealer to demonstrate an HPC cleaner on your job... or write us today for catalogs 250 and 500.

MALSBARY
SINCE 1921 MANUFACTURING CO.

Room C, 845 92nd Ave., Oakland 3, Calif.

82

IT'S YOUR BUSINESS . . .

Continued from page 23

8-10%. Highway work may top 1955 by as much as 25%.

The Texas Gulf Coast will hum with increased industrial building, mainly by chemical and oil industries. Major jobs are: Alcoa's $35-million alumina plant at Port Lavaca; a $24-million refinery for Aviation Fuel, Inc., Beaumount; a $16-million expansion by Sinclair Oil Co., Houston; and a $8-million Houston cement plant for Ideal Cement. The Texas Highway Dept. will spend about $174 million.

Eastern Missouri and southern Illinois construction should increase, particularly around St. Louis, Mo., where more than $165 million from bond sales voted in 1955 will start a large number of public works projects.

Construction prospects in the Far West look brightest in California and Arizona. Washington expects public work to increase, but in Oregon things "look slow" for early 1956.

California has a record highway year coming up. Industrial prospects are very good for the Los Angeles area, and for San Francisco and northern California. Los Angeles construction will surge upward when the crippling strike against rock and gravel firms ends. All types of work but housing should have a big year. San Francisco contractors say there's plenty of work, but it's highly competitive.

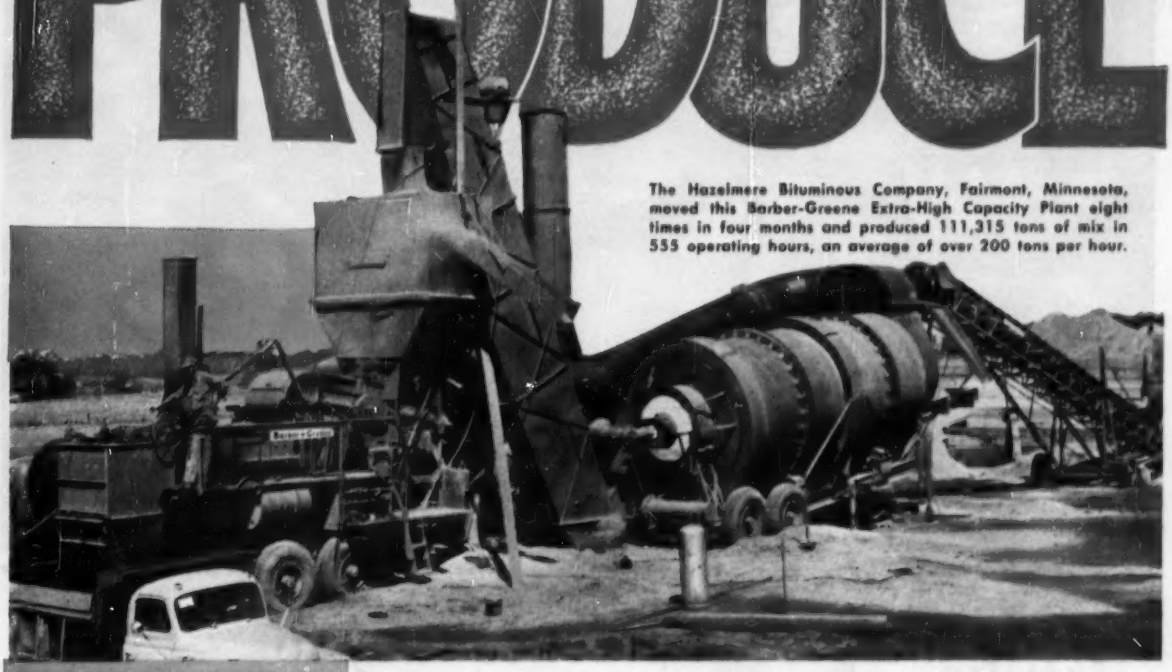
In Washington, Grant County PUD expects to take bids on the first of two hydro-electric dams in its $349-million Priest Rapids project. Bids will be called this month for a $18-million bridge across Lake Washington.

Predictions are for a record year in the Philadelphia area, eastern Pennsylvania, southern New Jersey, and Delaware. But this will mean shortages of vital materials will have to be licked. A repeat of 1955's steel and glass shortages could forestall new records. Industrial building and housing are the brightest elements in the 1956 outlook.

New England expects industrial and commercial building to boost total construction above the 1955 mark. But some observers are concerned over the rise in costs which they fear may hurt industrial building demand.

Industrial building also highlights the outlook in Ohio. Auto and steel industries have big plans for expansion.

PRODUCE



The Hazelmere Bituminous Company, Fairmont, Minnesota, moved this Barber-Greene Extra-High Capacity Plant eight times in four months and produced 111,315 tons of mix in 555 operating hours, an average of over 200 tons per hour.

NEW Model 848 Heavy-Duty Mixer

NEW Model 838 Dryer

NEW Model 868 Dust Collector

NEW Model 868-S Gradation Unit

. . . form this new Extra-High Capacity Barber-Greene Bituminous Plant

PRODUCE more tonnage per hour for more profit per season.

PRODUCE mixes to meet all specifications.

PRODUCE continuously with the plant that is inherently automatic.

PRODUCE uniformly with interlocked proportioning.

PRODUCE on more jobs, at the job site with the plant that's truly portable.

55-8A-8

WRITE for INFORMATION

descriptive literature . . . sound movies

cost studies . . . nearby job inspection . . . plant layouts

Barber-Greene

AURORA, ILLINOIS, U.S.A.

BG

CONVEYORS LOADERS DITCHERS ASPHALT PAVING EQUIPMENT

These three PRIME-MOVERS placed over 50 cu. yds. of concrete per hour

Here is the proven practical way to cut construction costs immediately!

Contractors switch to labor-saving PRIME-MOVER without complicated job preparation or set-up.

NOW, many contractors use a PRIME-MOVER when there is concrete to place — bricks to haul — materials to move.

The PRIME-MOVER is narrower than hand buggies and only six inches longer. One man with a PRIME-MOVER will place 12 to 17 cu. yds. of concrete per hour, or haul up to 300 brick per trip.

PRIME-MOVER has a dump bucket and a flatbed that interchange in seconds without tools. Powered by a dependable engine. The transmission requires a minimum of maintenance. PRIME-MOVER is stocked, serviced, and sold by leading distributors throughout the United States and Canada.

Write for job information and estimators performance data — and literature on the newest PRIME-MOVER, the Model 15A.

PRIME-MOVER pouring concrete from bucket

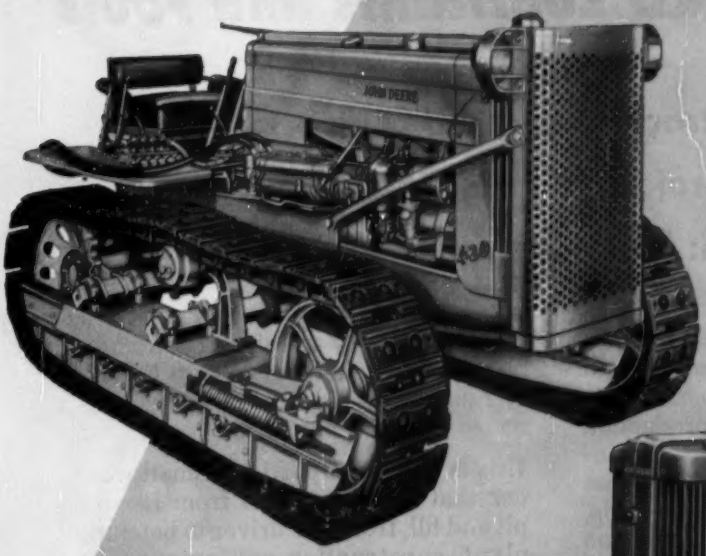
PRIME-MOVER hauling tile on flatbed

PRIME-MOVER

THE PRIME-MOVER CO., MUSCATINE, IOWA

EVERYTHING YOU WANT

in "Handyman" POWER and Equipment



JOHN DEERE CRAWLER

Weighs slightly over 4000 pounds . . . develops 25 horsepower on the drawbar. 4- and 5-roller sizes. A "little giant" in its work capacity. Choice of track shoes.

JOHN DEERE UTILITY

The "handyman" wheel-type tractor of a hundred-and-one uses. Low-built. Highly maneuverable. 3-point hitch regular.

EVERYWHERE . . . on many types of work . . . the John Deere Crawler and the John Deere Utility are making good in a BIG way with profit-minded contractors and industrial users.

Both models are built around the highly efficient, economical, and dependable John Deere engine. (The word economy is not used loosely. Owners' reports average only *one gallon of gas per hour* on all types of work!)

Here is the compact, rugged construction that has characterized John Deere-built products for nearly 120 years.

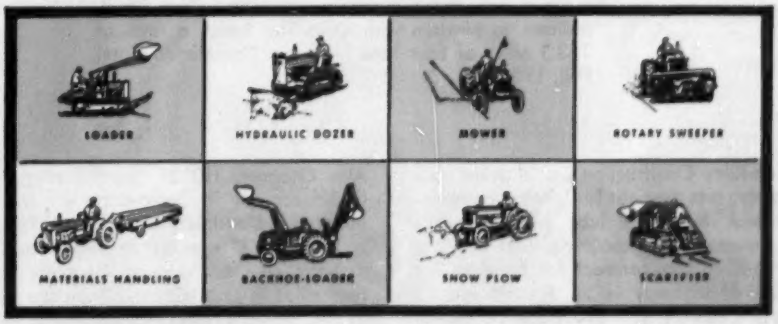
Here is the wide, all-around adaptability to jobs of all kinds, with a great matching line of John Deere and allied working equipment to choose from.

And here is the simplicity and accessibility you want for ease of servicing which spells LOW-COST MAINTENANCE throughout the long productive life of a John Deere Tractor.

There is a John Deere dealer near you.

JOHN DEERE
Industrial TRACTORS and Equipment

Send for FREE Catalog



JOHN DEERE ● Moline, Ill. ● Dept. D19A

Please send me latest literature on your "Handyman" Industrial Tractors.

Name _____

Title _____

Firm _____

Address _____

City _____ *State* _____

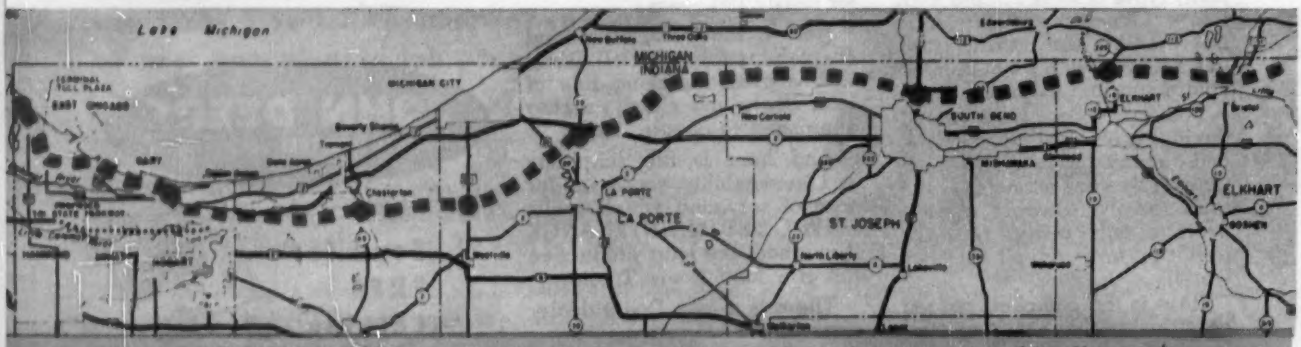
Indiana Toll Road Contractors use STANDARD Lubricants and Fuels

Prime contractors and sub contractors on the project choose STANDARD. Reason: 1 top quality 2 service

The Indiana Toll Road is the biggest construction project ever undertaken in the State of Indiana. All parts of the job are going at a high production rate. To maintain such a record, contractors must get top performance from equipment. STANOLUBE Motor Oils, STANDARD Diesel Fuels and STANDARD Gasolines help them get this kind of performance—with plenty to spare—from all types of equipment, under all operating conditions, in any weather.

To keep on schedule, supplies of lubricants and fuels have to be where needed at any hour, day and night. Standard Oil maintains stocks at the job site for every one of the contractors served. Equipment never waits for fuel or lubricants. Time down for maintenance is cut to minimum.

This is big construction. Small wonder that on this project from borrow pit and fill, from pile driver to batching plant, construction equipment uses STANDARD lubricants and fuels. Big job or small, let Standard be your supplier. In any of the 15 Midwest and Rocky Mountain states, Standard Oil automotive lubrication specialists are nearby and ready to help you. Call them or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

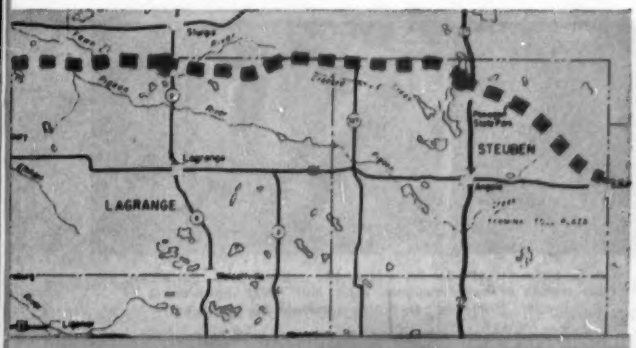


Indiana Toll Road traverses state from Hammond, Indiana to junction with Ohio Toll Road, a total of 153.3 miles of four lane highway. Completion date: Fall, 1956.

Rieth-Riley Construction Co., a prime contractor, cuts time out for lubrication maintenance by using lube truck; services construction equipment right at the job. Rieth-Riley has contract for building 7.4 miles of highway in St. Joseph and La Porte Counties; sets fast pace for equipment, uses Standard Oil Products.

Allis Chalmers HD 21 "push-loading" a Euclid scraper in borrow pit on Union Building & Construction Corp., job. Union is building 13.1 miles of Toll Road in Steuben and La Grange Counties and four miles in Lake County. They are one of the prime contractors on the project served by Standard Oil.

Equipment Superintendent, Lewis A. "Shorty" Martin (right), and Standard automotive lubrication specialist O. H. "Grit" Collier discuss parts maintenance at Western Contracting Corporation field shop. Field technical service such as this is old stuff to Grit Collier. He has been doing such work for 10 of his 22 years at Standard Oil. Grit is a graduate of the Standard Oil Sales Engineering School. Customers find this experience and training pay off for them.



Quick Facts About

STANOLUBE Motor Oils

1. STANOLUBE Heavy Duty Motor Oils are refined from high quality base stock.
2. Additives exclusive with STANOLUBE Heavy Duty Motor Oils retard oxidation, reduce formation of piston and ring belt deposits.
3. These additives in STANOLUBE Motor Oils prevent fuel from forming varnish and sludge.

STANDARD

STANDARD OIL COMPANY
(Indiana)

Down time is no joke.

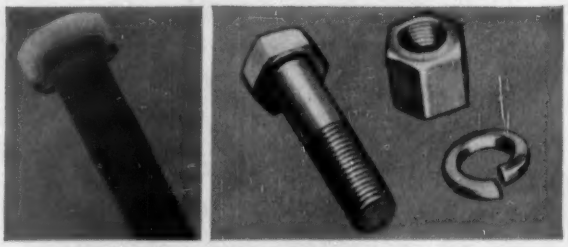
But it happens at times when track hardware gives out.

If you replace with original Caterpillar hardware, here's what you're sure of: bolts, nuts, capscrews and lock washers made from prechecked fine-grade steels, carefully hardened and tested, finished to the strictest specifications in the industry. You're sure of longer wear life, no matter how tough your jobs come. You're sure of *less* down time in the future.

If you replace with substitute hardware—can you be sure of anything?

Better get Caterpillar parts every time.

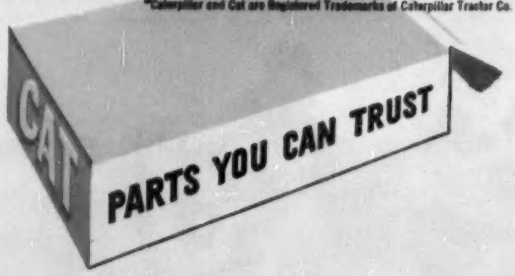
Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



On the surface, CAT® hardware looks like ordinary kind. But etched cross section of newly designed track bolt (left) shows depth of special "Hi-Electro" hardening penetration in bolt head.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



YOUR WICKWIRE ROPE DISTRIBUTOR SUPPLIES THE ANSWERS TO WIRE ROPE PROBLEMS

One of the best ways to find out "what goes" is to be right on the spot. That's why a Wickwire distributor is a wire rope expert—he practically lives with the industries he supplies with wire rope. He knows his customers' specialized problems from first-hand experience, and is able to give competent practical advice on the best construction—6x19, 6x37, 8x19, etc.—for them to use. And he delivers the type, size and length of wire rope they need directly from his warehouse stocks. They save time . . . storage space . . . paper work.

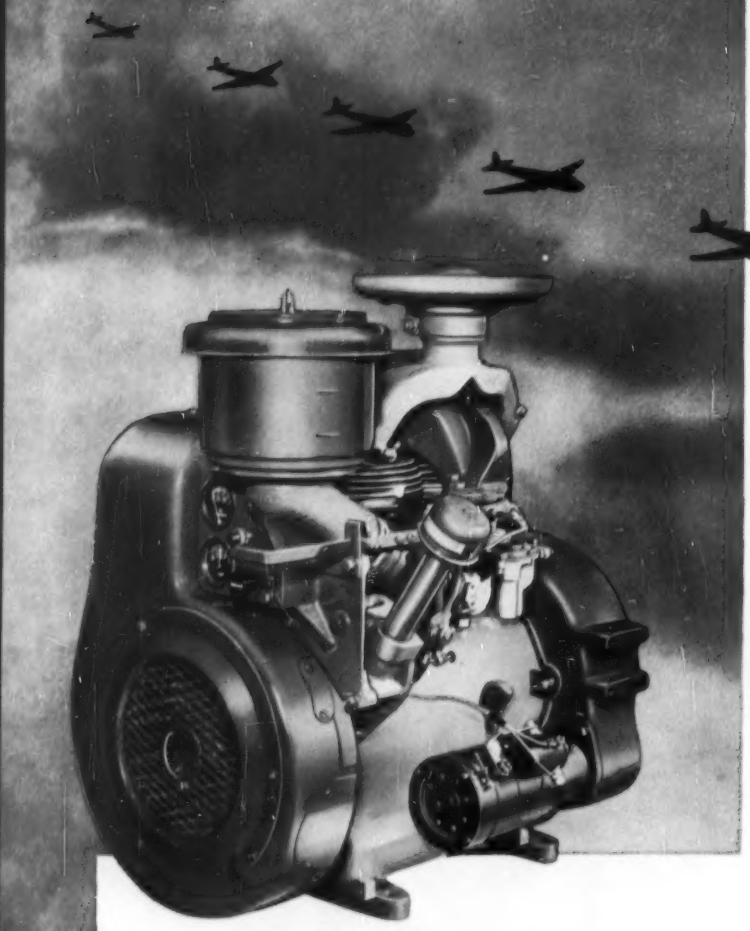
Your Wickwire Rope distributor is a good man to know. He's quality people handling quality products. Buy your wire rope and wire rope slings from him. You'll find that the many valuable services he offers far outweigh any apparent price advantage you might gain by buying direct.

CF&I WICKWIRE ROPE A CF&I PRODUCT

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

3153

NOW... out of 250 million hours of flight power experience comes



a NEW air-cooled industrial engine the FULL POWER LYCOMING C2-90

Rated 30 H.P.! Delivers 30 H.P.!

Specifically designed to solve construction industry problems

The C2-90 is built to the same high standards that have made Lycoming a top name in aircraft engines for over a quarter century. The C2-90 does just what we say it will do—work at full power under the most rugged conditions. So why buy an engine you have to de-rate (up to 50% for continual duty service)?

Reserve Power—C2-90's full-power rating provides ready reserve for everything from heavy generators to light pumps.

Long Life—C2-90 is ruggedly designed for thousands of hours of dependable service.

Cooling Design—C2-90 provides newly improved cooling surfaces to avoid overheating from dust conditions; a cooling fan that operates through entire speed range.

All-Weather Performance—C2-90 advanced air-cooled design delivers rated output in high temperatures or sub-zero.

Imagine running your car for 80,000 continuous miles without service! In Williamsport, Pa., the C2-90 was test-run at full load, full throttle for over 1,000 continuous miles with no service except for gas and oil. This is equivalent to running your auto 80 miles an hour for 1,000 hours non-stop, or 80,000 continuous miles *without service!*

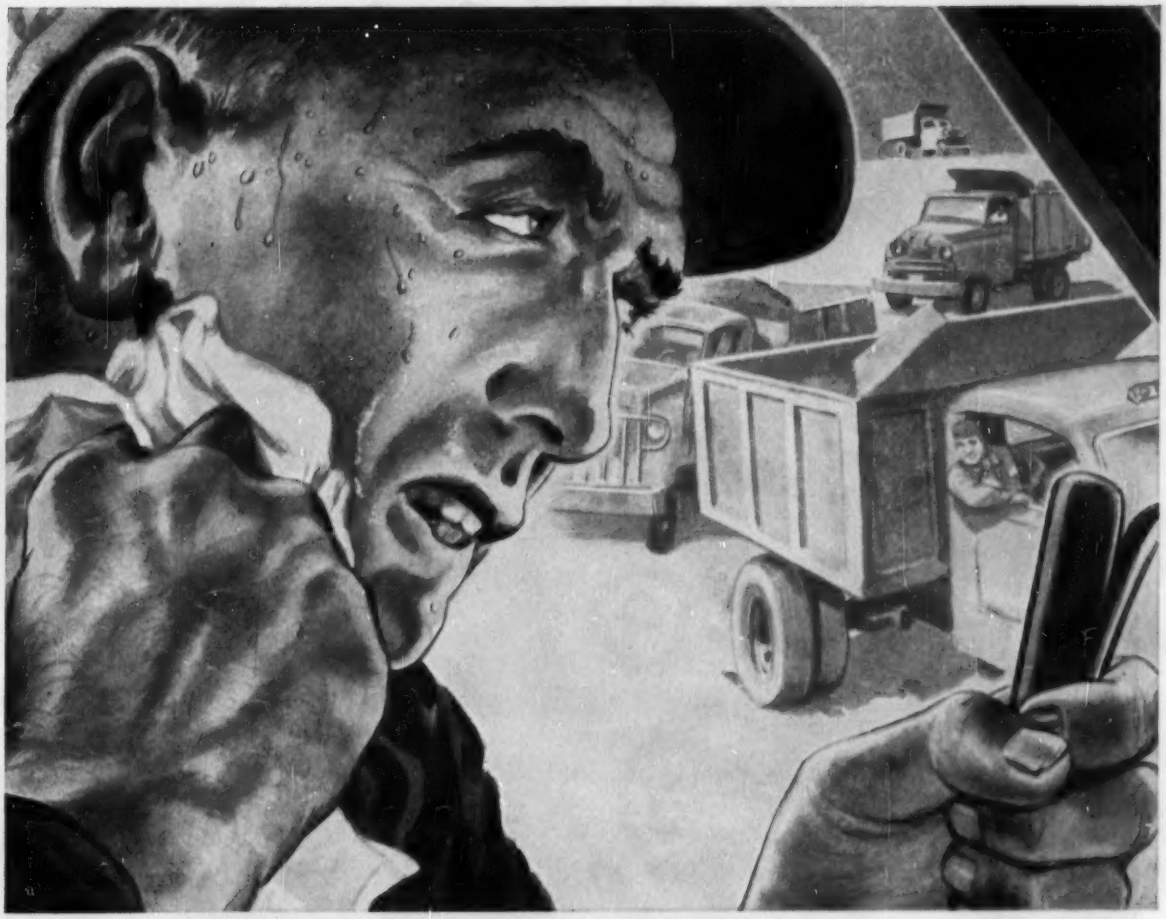
LOOK TO

For full details on the new Lycoming C2-90 write:
Sales Engineering, Industrial Engines,
Lycoming, Williamsport, Pa.

Lycoming

AVCO MFG. CORP. **defense and industrial products**

combine the scientific skills, and production facilities of 3 Avco divisions of Avco Manufacturing Corp. . . . Lycoming; Avco Advanced Development; Crosley—to produce power plants, electronics, air-frame components, and precision parts.



Shovel-Crane owners!

Working a hard 8 hour day... getting only 6½ hrs. output?

Operator fatigue can cost you important money. Here's how to minimize it!

THINK about the job you're working now. How much *more* money could you make if operators—good as they are—suffered little if any end-of-the-shift-letdown . . . never had to climb out and unlimber "cramping" arm and leg muscles?

Fingertip-operated Link-Belt Speeder power hydraulic controls minimize fatigue

With Speed-o-Matic—the true power hydraulic control system—shovel-crane response is fast, positive, easy. So easy that operators are actually "eager" to push the rig to its limit—all shift long! And what a limit!

You've never seen any machine that can compare with a Link-Belt Speeder for cat-quick agility and long-lived, bulldog stamina. Report after report shows these rigs account for up to 25% or more output per shift.

Seeing is believing

The precision construction, the quality materials and the advanced engineering that have gone into today's Link-Belt Speeder speak for themselves. All we ask you to do is see your distributor and judge for yourself. Be as critical as you like! No shovel-crane on the market today—crawler or rubber-tired, ½ to 3-yd, 8 to 60-ton capacity—can compare. Visit your distributor today or write for literature—LINK-BELT SPEEDER CORPORATION, CEDAR RAPIDS, IOWA.

LINK-BELT SPEEDER

Builders of a complete line of crawler and rubber-tired shovel-cranes.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Photo courtesy Construction Aggregates Corp., Chicago, Ill.

A rubber gangplank for tomorrow's turnpike

A typical example of B. F. Goodrich improvement in rubber

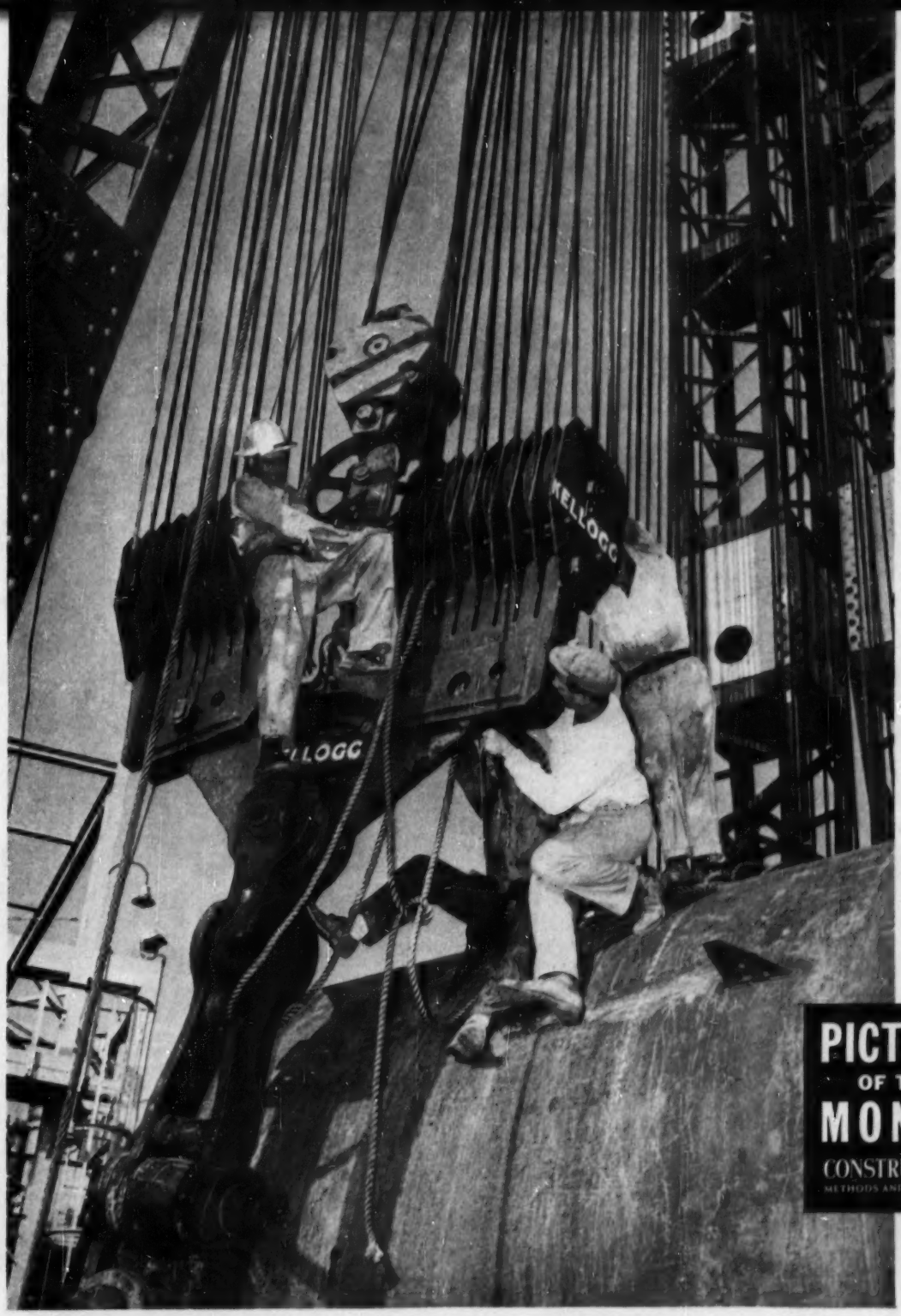
THAT'S wet, sharp gravel being loaded on a ship. With millions of tons needed for new highways, gravel must be handled at low cost. A conveyor belt to shipside was the fastest and cheapest way.

But the wearing avalanche of 2800 tons an hour dumped on the belt cut and tore the rubber cover, broke the fabric reinforcement. Then engineers suggested a B. F. Goodrich *cord* belt. It is built with cords, running lengthwise, held in place by rubber. When heavy loads hit this belt it "gives"—absorbs the shock instead of fighting it. The rubber in the belt is so tough it can stand the cuts and gouges of millions of sharp edges. When this picture was taken, the B. F. Goodrich cord belt had carried more than 14 million tons, had lasted longer than any belt ever used by the company, and still looked good for years more.

Product improvement like this is *always* going on at B. F. Goodrich. New ways are constantly being found to make conveyor belts, V belts, hose, all sorts of products work better, last longer. No product is ever regarded as "finished" or standardized.

How this cuts your costs: Because of these improvements and because B. F. Goodrich is one company that will *never* lower its quality standards, you can be sure of top performance and real money savings when you specify B. F. Goodrich. To find out about the latest improvements in the rubber products your company uses, call your B. F. Goodrich distributor or write *The B. F. Goodrich Co., Dept. M-536, Akron 18, Ohio.*

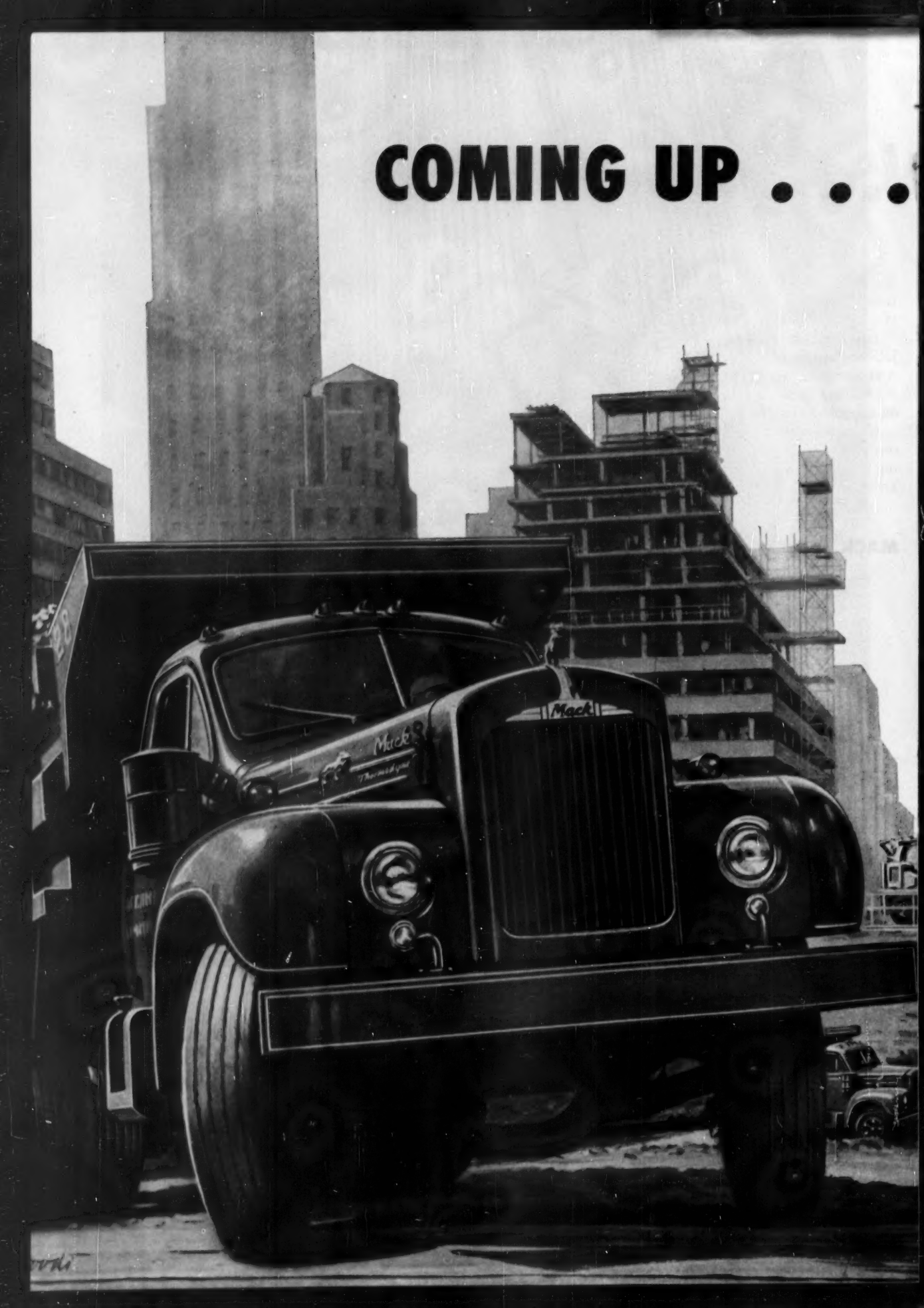
B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION



PICTURE OF THE MONTH
CONSTRUCTION METHODS AND EQUIPMENT

Special Rig Raises Big Tower

RIGGERS bolt the last block to special equalizing linkage before raising a 90-ft., 306-ton tower at a refinery. M. W. Kellogg Co., New York, erected four gin poles in pairs on opposite sides of the foundation and rigged each pair with two sets of 8-sheave blocks. Hoisting cables were reeved with an equalizing sheave between each pair of blocks to assure uniform load distribution. Each end of the single load line went to a separate winch to equalize the lifting force automatically. Running gear alone required more than 1.5 miles of wire rope.


COMING UP . . .
Mack
Mack

. the greatest year yet

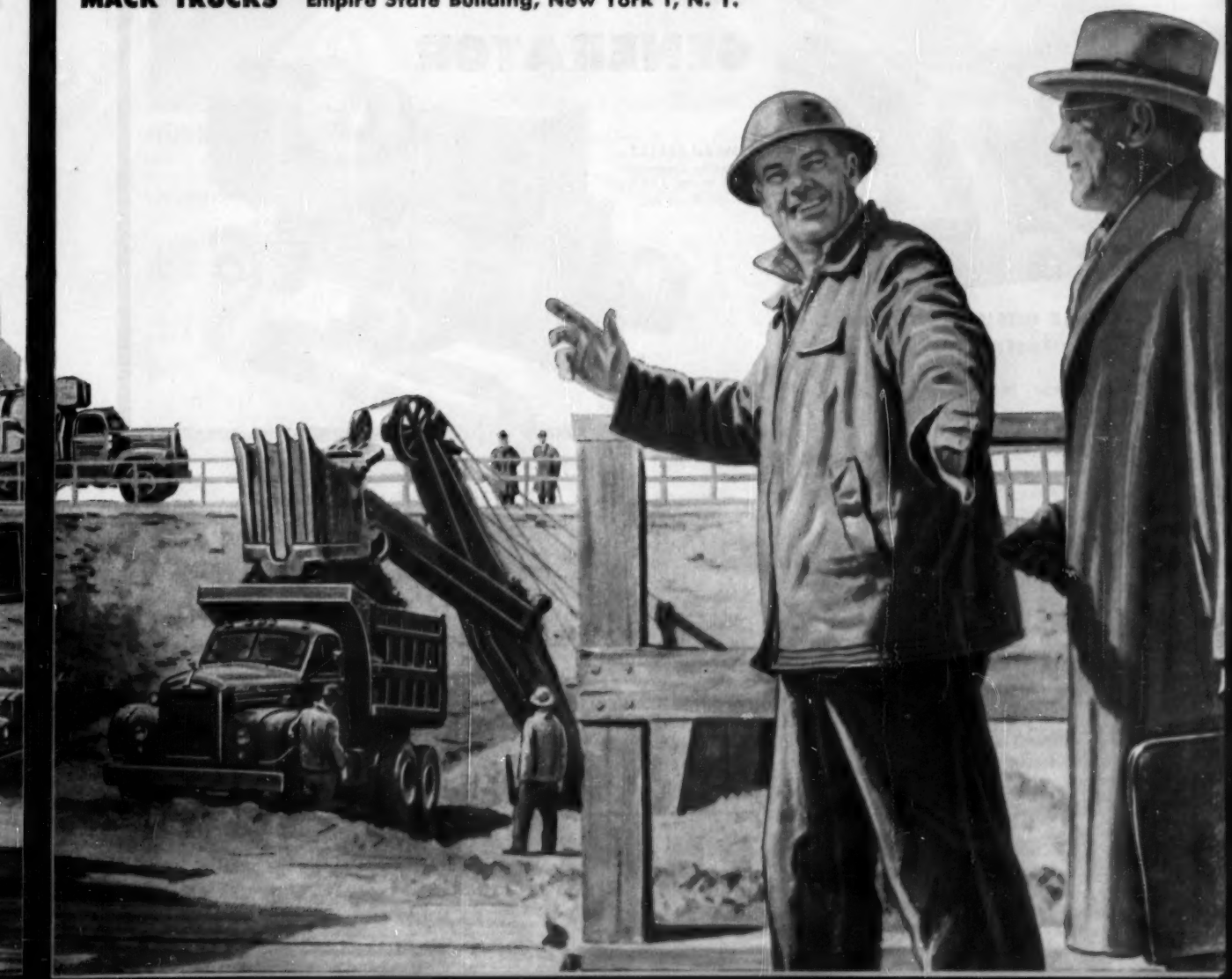
By even the most conservative predictions, 1956 promises to be the greatest year yet for the construction industries.

This means that there will be even more jobs and bigger jobs to do than ever before. And wherever there's important, demanding hauling to be done, you'll find Macks on the jobs—the *Mack-sized* jobs.

When it comes to moving earth, rock, ready-mix concrete, equipment and building supplies, the construction industry knows there's nothing like Macks. For instance, the economy-champion Mack Thermodyne® Diesel engine, the sure-footed Balanced Bogie with exclusive Mack Power Divider, traditional Mack rugged construction . . . these are among the many Mack features that assure long, trouble-free life at the lowest maintenance costs. You can count on Macks to get more work done—on schedule, and at a profit.

At the beginning of the new year, isn't it a good time to remind yourself again "Can I afford *not* to use Macks?"

MACK TRUCKS Empire State Building, New York 1, N. Y.



ALL NEW DESIGN!

Simple...Foolproof...Low Cost

1500 WATT HOMELITE GENERATOR

Model 35A115
Homelite Generator
1500 Watts, 115 Volt
60 Cycle AC

As easy to move as an electric hand saw!

1. New Money-Saving features . . . No DC brushes; just two easy-to-get-at collector ring brushes . . . No commutator or DC windings . . . No intermediate couplings; armature keys directly to shaft. Fewer parts to wear out — longer trouble-free generator service.

2. Constant Voltage . . . less than 4% change from no load to full 1500 watt capacity . . . assures long service life for your electric tools . . . guarantees top performance at all times.

3. Overload Capacity . . . 1500 watt continuous duty with generous overload capacity prevents tool stalling under heavy loads . . . insures uninterrupted service even when starting loads exceed operating loads.

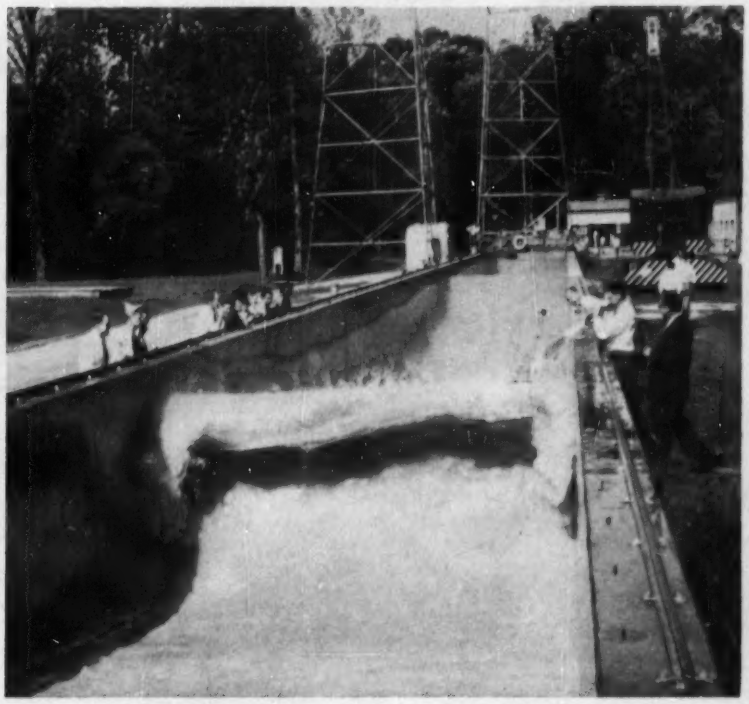
4. Compact and Lightweight . . . one man can easily carry this generator wherever you need electricity to power time-saving electric tools. No need for long, hazardous power-consuming cables.

Whatever tools you want to operate — electric saws, drills, floodlights, grinders, belt sanders, hammers, — the new Homelite 35A115 generator can save you money. For a free demonstration or additional information, call your nearest Homelite representative, or write:

SAVE EVEN MORE! New Homelite electronic idle control unit, available as optional accessory, runs engine at idle speed when no current is drawn . . . automatically brings engine to full speed when load is applied.
Ask your Homelite representative to show you how this easily-installed accessory reduces engine wear . . . increases service life . . . cuts fuel consumption.

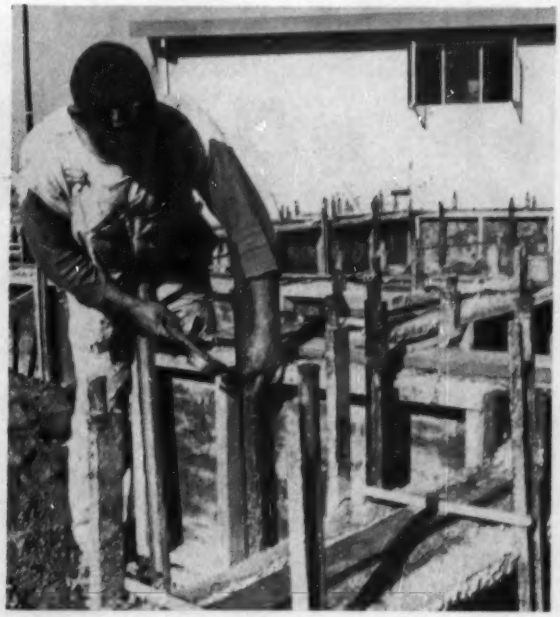
HOMELITE *A DIVISION OF TEXTRON AMERICAN, INC.*
1001 RIVERDALE AVE., PORT CHESTER, N. Y.
Manufacturers of Carryable PUMPS • GENERATORS • BLOWERS • CHAIN SAWS

Construction News in Pictures



HURRICANE FORCE—The Army's Corps of Engineers is using the world's largest wave-testing tank to study the effect of waves on piles and on beach shores. The tank produces waves up to 7 ft high to help design coastal works capable of withstanding hurricane waves. Blackwell Engineering Co., Warrenton, Va., built the concrete tank.

SWINGING IN AIR—Workman sits in bosun's chair suspended from a crane's boom to strip Symons forms for Sharps Brothers Contracting Co. at Kansas City's airport.



FOUNDATION STAKES — Wood foundation stakes broke like matchsticks in the black adobe soil of San Francisco's East Bay area. But steel stakes with tie bars to lock them firmly together worked fine. Holes in the channel of the stake allow nails to be driven through into wood concrete forms.

CAVE-IN—A burst water main caused the cave-in of 148 ft of steel sheet piling supporting banks during excavation for the new $20 million Senate Office Building in Washington, D.C. The contractor, John McShain, Inc., of Philadelphia, Pa., estimates the cost of repairing the damage at approximately $50,000.

UP SHE GOES—Crane lifts into place a 60-ft roof truss of new design. Steel tension members for the lower chord are combined with long-length plywood for the upper chord. The truss is fabricated in standard sizes by Plywood Structures Incorporated, Portland, Ore. At the site the plywood is nailed to the plate and bolted at each panel point. PSI (manufacturer's initials) trusses for this warehouse are supported on continuous lintel beams with columns every 24 ft. Cost of the warehouse was only $2 per sq ft.

TEAMWORK— Five Calweld truck-mounted drills team up to speed foundation work for a Chicago housing project. Rigs belong to Case Foundation Co. General contractor is Sumner Sollitt Co., Chicago.

INGENUITY— Contractor H. C. Gale (right) of Harrisburg, Pa., devised blade for International Drott TD-9 Skid Shovel to dig curb footings. It cost him only $100 for materials and labor, and it digs a uniform cut up to 22 in. below grade. Made from ¾-in. steel plate 28 in. wide, the blade angles 15 deg forward from the bottom of the bucket. Plate is supported by 2x2x5/16-in. angle irons, each 47 in. long.

new

DESIGNED AND BUILT IN THE SAME WORKSHOPS AS THE WORLD FAMOUS SAPPHIRE JET AERO ENGINES

The latest addition to the

ARMSTRONG SIDDELEY

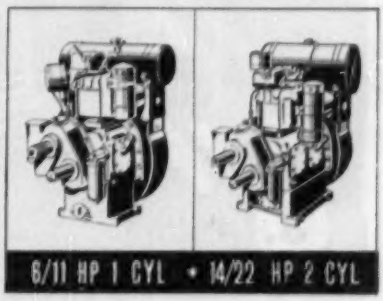
range of

DIESEL AIR COOLED engines

The outstanding 20-33 h.p. 3-cylinder model

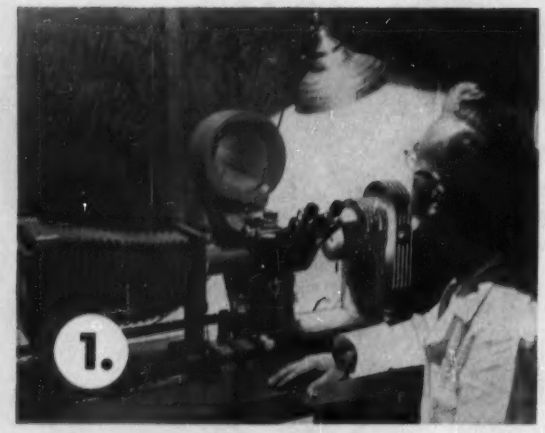
Air cooled for simplicity and reliability. Light weight—highly efficient in all climates—low fuel consumption. All parts accessible and maintenance costs low—minimum dimensions.

Armstrong Siddeley diesel power units are fitted by leading manufacturers of equipment for agriculture, industry, and marine use, including: Atlas Diesel Ltd., Aveling-Barford Ltd., B.T.H. Ltd., International Harvester Co. of Gt. Britain Ltd., Massey-Harris-Ferguson Ltd., Parsons Engineering Co. Ltd., Ransomes, Sims & Jefferies Ltd. From 6-33 h.p., one, two, three cylinders—most parts interchangeable.



ARMSTRONG SIDDELEY MOTORS LIMITED
PARKSIDE . COVENTRY . ENGLAND
MEMBERS OF THE HAWKER SIDDELEY GROUP

Tuffy® Tips



Here Are Some Of The Steps Taken To Pre-Determine Tuffy Toughness And Assure Longer Rope Life

1. Metallographic Examination. Under powerful magnification, Union Wire metallurgists examine the microstructure of the steel in rods and wires to see that rigid specifications are met and maintained in processing.

2. Chemical Analysis Laboratory. Steel for Union Wire Rope is made to rigid specifications. Here rods and wire are chemically analyzed to make certain that the correct combinations of carbon, manganese, etc., are kept under control.

3. Designed by Union Wire Rope Engineers. This accelerated fatigue tester is equipped with sheaves from 8" to 24" permitting application of any bending stress. Tensile loads up to 12,000 lbs. are applied. Thus wire rope life under toughest fatigue conditions is pre-determined.

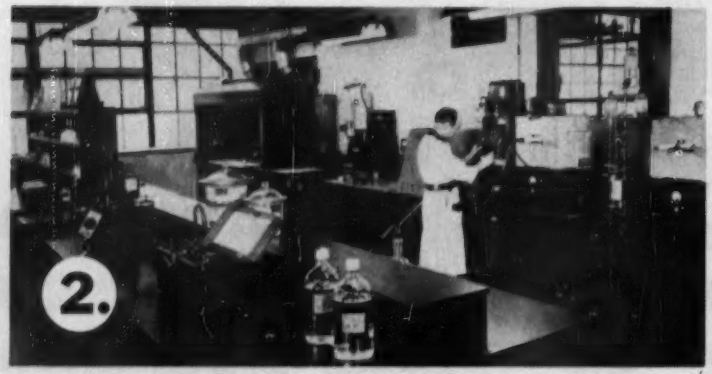
4. Rope Testing Machine. This 3-story high machine is designed to test and record the breaking strength of the rope when finished and ready for the customer.

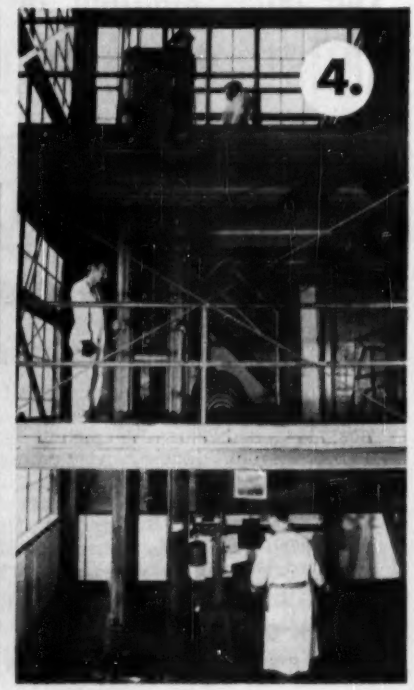
5. Static Flexibility Tester. The demand of machinery engineers toward smaller sheaves and higher speed made it necessary for Union Wire Rope Engineers to adapt this standard machine in order to test static flexibility.

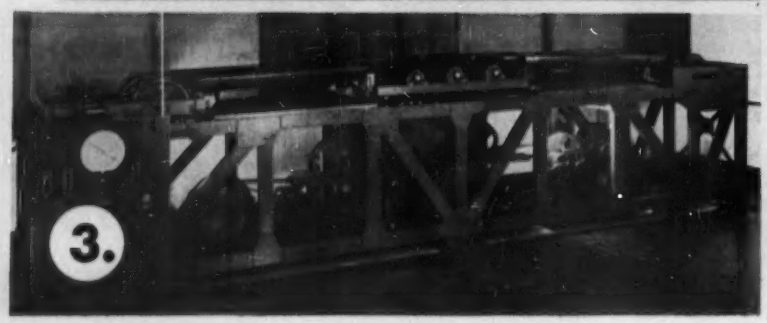
6. Wire Tensile & Torsion Tester. In tension and under torsion, this machine tests wires to see that they measure up to the extraordinary high level of strength and toughness mandatory in Union Wire Rope.

7. Another View Of Accelerated Fatigue Tester. Shows simultaneous testing of three different wire rope constructions. Here, in days, ropes are subjected to punishment equal to weeks or months of hard service.

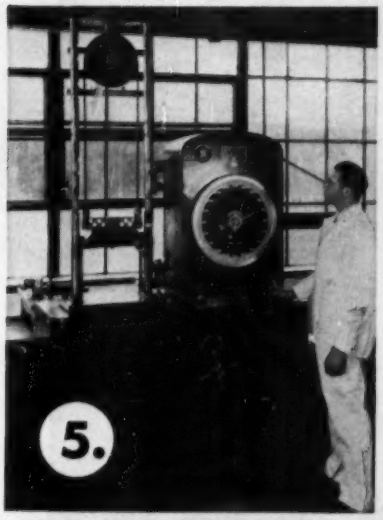
8. Wire Fatigue Testers. The fatigue strength of wire rope is the sum total of the fatigue strength of the wires in its construction. Here, the wires in tension and bending are tested for fatigue strength.

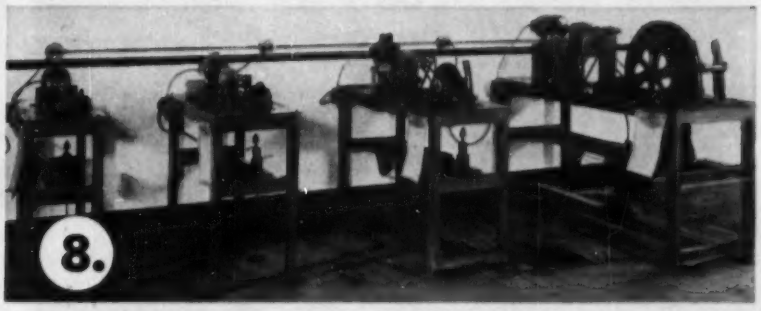




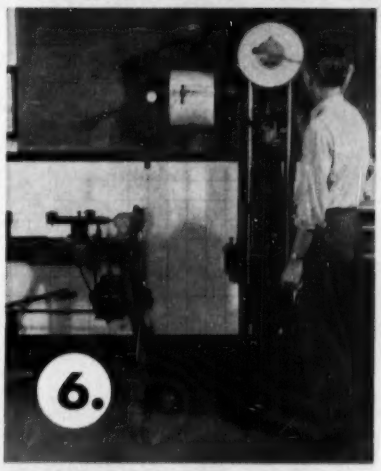


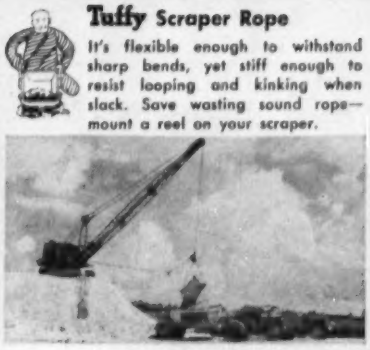
How Research Puts Longer Service Life Into WIRE ROPE





When you specify one of the Tuffy Wire Ropes, you can say Tuffy and forget complicated specifications





Tuffy Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.

Tuffy Slings and Hoist Line

Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine braided wire fabric. Kinking or knotting will not materially damage fabric.

Tuffy Dragline

Constructed to give you maximum abrasive resistance with extra flexibility. Rides smoothly on grooves, hugs the drum when casting for full load.

Tuffy Dozer Rope

Increases service life . . . reduces down-time. 150' reels mounted on your dozers let you cut-off worn sections without wasting good rope. 1/2" and 9/16" diameter.

Your Tuffy Distributor Works For You

He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

union Wire Rope corp.

2270 Manchester Avenue Kansas City 26, Missouri

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand

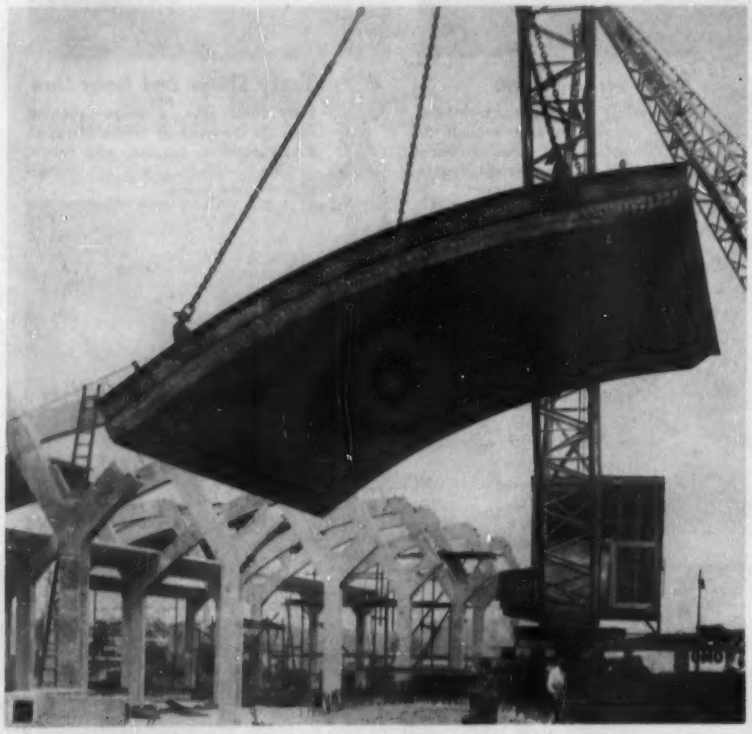
Construction 'Round the World

In India . . .

The 79-mi Rajpath (Royal Road) spirals up from the Indian plains over an 8,000-ft pass to Khatmandu, capital of Nepal. A force of 9,000 Nepali laborers under the direction of Indian Army engineers began construction in 1952. Landslides, thick virgin forests, and monsoons—which force suspension of work from June to September—complicated construction. But now the road is open to military traffic even though surfacing is not complete, and it will be dedicated formally by King Mahendra of Nepal early this year.

In Israel . . .

Temporary bridge simplifies construction of a sewage line into the sea at Tel-Aviv. Piles for bents to carry the sewage line also support the bridge until the pipe is in place. Then they will be cut away. Arpad Gut of Tel-Aviv is the contractor.



In England . . .

Shell roof goes up for new British technical college at Kingston-upon-Hull. Roof is made up of units 2½ in. thick cast on the site. Each unit measures 16x24 ft and weighs 7 tons. Frame of the single-story structure consists of a series of north-light bays of reinforced, precast concrete members, tensioned after erection. The precasting bed for roof slabs is over 200 ft long—big enough to produce eight prestressed units at once.

In Brazil . . .

Reinforced concrete water reservoir for Rio de Janeiro was only partly filled when one wall ripped away from its base and broke up. Inadequate drainage under the floor and seepage in base seams are blamed.

The Black & Decker® line is POWER-BUILT TO SPEED CONSTRUCTION!

We don't buy motors – we build them!

The *heart* of your electric tool is the motor—completely built by Black & Decker! All the power you need and then some—because each motor is built for a specific tool and the job it must do. Black & Decker motors always *stand up!*

DRILLS—32 models

SANDERS—4 models

HAMMERS—4 models

SAWS—4 models

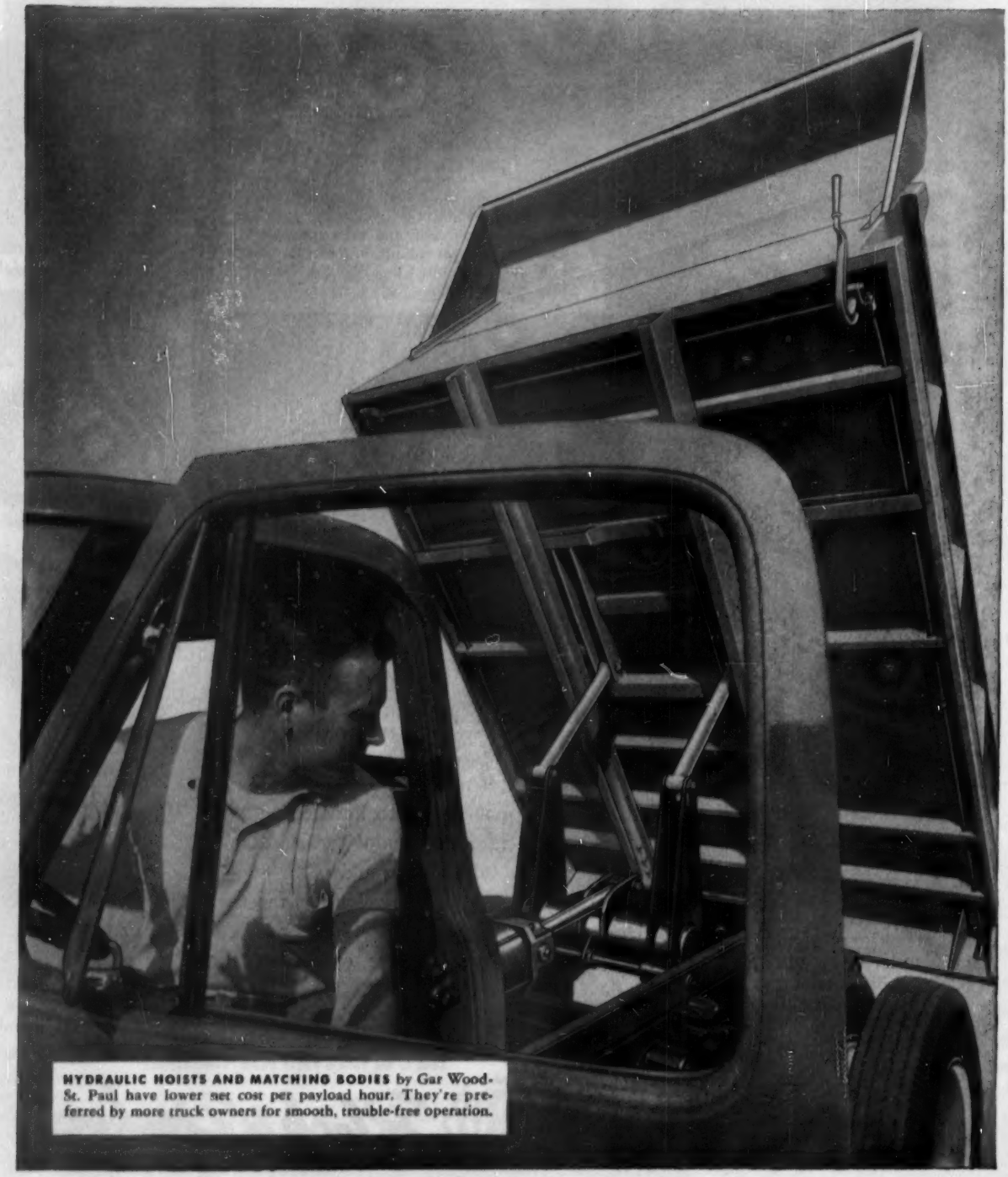
Put Black & Decker portable electric tools on your job—and watch the tempo increase! B&D tools are *Power-Built* to give better results, longer life. Every B&D tool—whether it's a B&D Saw, Drill, Sander or Hammer—is powered by a *B&D-built* motor, specially designed for each specific tool and the work it must do! All B&D tools are compact, easy to handle, light for their tremendous power. B&D tools save lots of time and labor—which cuts your costs, helps you meet demanding schedules. See your B&D distributor today or write: THE BLACK & DECKER MFG. CO., Dept. 2601, Towson 4, Maryland.

Service...one of 42 Black & Decker service branches is located "next door" to you; to give fast, expert service!

Look in the Yellow Pages under "Tools-Electric"

Black & Decker®
PORTABLE ELECTRIC TOOLS

LOOK TO GarWood -St.Paul-



HYDRAULIC HOISTS AND MATCHING BODIES by Gar Wood-St. Paul have lower net cost per payload hour. They're preferred by more truck owners for smooth, trouble-free operation.

FOR LEADERSHIP in Truck Equipment

Consolidation of America's pioneer hydraulic hoist companies offers advantages in engineering, sales and service for truck equipment users

Now there's *one* name to remember for the most advanced line of truck equipment on the market! It's Gar Wood-St. Paul, a name made possible by the recent consolidation of these two pioneer hydraulic hoist companies.

This is the most important news for truck equipment users since the invention of the hydraulic hoist! It brings these major advantages to you:

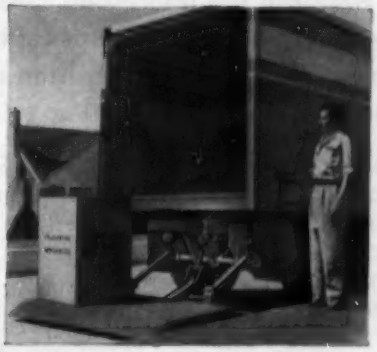
Engineering know-how and manufacturing skill — Gar Wood invented the hydraulic hoist . . . St. Paul developed it. Now both organizations are combined for new advances in truck equipment design.

One world-wide sales and service organization of leading truck equipment distributors . . . experienced in application, qualified to analyze your equipment requirements and recommend the most efficient unit to fit them. This organization will also offer prompt service on any Gar Wood or St. Paul equipment you may already own.

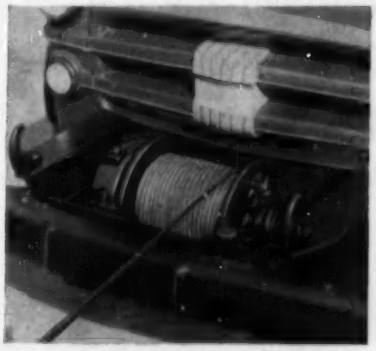
New savings in shipping costs—With three modern plants producing the Gar Wood-St. Paul line, your distributor can select the base point most economical for you.

Find out now about the consolidated line of Gar Wood-St. Paul truck equipment . . . hydraulic hoists and bodies, Frate-Gates, truck cranes and winches, and sanitary refuse collection units. For the name of your nearest Gar Wood-St. Paul distributor, write now to: Customer Service Department, Gar Wood Industries, Inc., Wayne, Michigan.

GAR WOOD LOAD-PACKERS, the original packing-type refuse collection units, provide greater sanitation at lower cost for both community and industry.



GAR WOOD-ST. PAUL FRATE-GATES, with power closing, cut delivery costs . . . speed loading and unloading . . . reduce damage claims.



GAR WOOD WINCHES feature exclusive aluminum housings for faster heat dissipation, less dead weight. They're also components of Gar Wood Truck-Mounted Cranes.

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan • Richmond, California

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

Gar Wood Truck Cranes

Gar Wood-St. Paul PTO Units

Gar Wood-Buckeye Spreaders

Gar Wood-Buckeye Finegraders

Gar Wood-Buckeye Ditchers

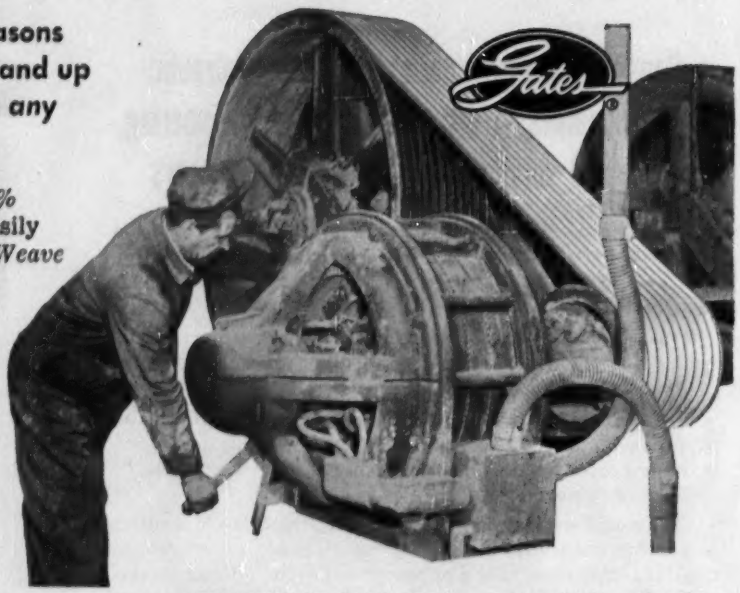
Gar Wood Excavators

Withstands far greater SHOCK LOADS than any standard V-belt

Here are the interesting reasons why Gates Super Vulco Ropes stand up months, even years longer than any standard V-belts...

1. *Super-Strength Cords* provide 40% greater horsepower capacity . . . easily absorb heavy shock loads. **2.** *Flex-Weave Cover* (U.S. Pat. No. 2519590) provides greater flexibility with far less stress on the fabric. Cover wears longer — increases belt life, lowers belt costs.

3. *Concave Sidewalls* (U.S. Pat. No. 1813698) provides sure pulling power, longer wear because sides straighten out as belt bends— make even contact with sheave walls.



SHOCK LOAD of this big jaw crusher at Canadian Quarries, Ltd. is absorbed by Gates Super Vulco Rope Drive. Wherever shock load is severe, Gates Super Vulco Ropes cushion the shock—keep machinery replacement cost down.

4 other outstanding advantages

Resists Oil, Heat and Weather: Long life is assured even in the presence of excessive oil . . . even under prolonged exposure to heat and weather.

Provides Static Safety: The high electrical conductivity of Gates Super Vulco Ropes provide safer drives in explosive atmosphere.

Has Little Stretch When Wet: Low moisture absorption eliminates need for special take-up in wet locations.

Saves Space: Higher horsepower rating and greater resiliency may permit fewer belts, or smaller sheaves where space saving is vitally important.

Gates SUPER Vulco Rope

The V-Belt with 40% more horsepower capacity

TPA 57

JANUARY, 1956

VOLUME 38 • NUMBER 1

HENRY T. PEREZ, Editor

CONSTRUCTION METHODS AND EQUIPMENT

Labor's Challenge

THE POWER that the newly merged American Federation of Labor-Congress of Industrial Organizations can wield is considerable. And that power, used wisely, can help advance the construction industry.

Generally, an attitude of sweet reasonableness prevailed at last month's AFL-CIO organizing convention. But beneath the surface manifestations of unity lie many unresolved differences of opinion and purpose that must be settled before labor is, in fact, one.

Just prior to the convention, AFL's Building & Construction Trades Department expressed concern over the imminent merger. It warned that the worker should belong to "a single trade movement, a union of his craft," and that the merger must not "give to any industrial union a blank check to take into its organization everyone who may work in a plant or an industry."

In setting up an Industrial Union Department, AFL-CIO reorganized this problem. IUD, while primarily concerned with the "interests of industrial unions," recognizes that "both craft and industrial unions are appropriate, equal, and necessary as methods of union organization." Ten building trades unions joined IUD the first day, bringing in more than 1¼ million of their members.

Unity of labor at the top national level is no guarantee of a harmonious mating at lower levels. Hundred of AFL and CIO state, county, or city bodies are still outside the fold. They have two years in which to effect the merger, according to last month's agreement. Until merged, they will continue to represent the same respective local unions they do now.

Because skepticism, or even outright distrust, of merger with "rival" unions is often keenest at these levels, the going will be rough. And it may be that extra attempts to extend jurisdiction will be made in order to enter into merger negotiations with stronger hands.

On two broad fronts—ethical practices and health and welfare plan administration—AFL-CIO passed sweeping resolutions. If they were put into actual practice at all union levels, the construction industry would gain immeasurably.

In calling on its unions to adhere faithfully to their "mandate to keep our organization free from any taint of corruption," AFL-CIO warned labor to keep its own house in order. Failing that, the government would have to step in to keep the labor movement "free from the infiltration of racketeers and crooks." And vice president James B. Carey pointed out that insistance on complete and regular accounting of union funds is the best possible insurance against unethical practices.

Much the same points were made in regard to administration of welfare funds. Unions were urged to maintain comprehensive records and have their funds competently audited at least semi-annually. And the convention called on Congress to enact legislation "requiring annual reports and public disclosure of the financial operations of health, welfare, and pension plans, including the details of the related financial transactions of insurance carriers and service agencies."

The convention, understandably enough, took no notice of such things as restrictive practices or featherbedding. Nor did it go on record about jurisdictional disputes. Within the merged groups, however, the Building Trades Department and the Industrial Union Department set up a permanent joint committee "to develop rules of procedure for the adjustment of any conflict of interest that may presently exist or may arise in the future."

In sum, there is a hopeful air about the new AFL-CIO. If united labor can police itself, can insure that its high resolve is put into practice at all levels of the labor movement, then both construction labor and construction management will be winners.

Three Floods Hit New England Hard, But...

Contractors Make Dirt Fly to Keep Massachusetts Turnpike on Schedule

THE THROTTLE is open wide on construction of the Massachusetts Turnpike. It was open most of the summer, too. Then the rains came. An entire year's normal rainfall fell within two months, most of it in three separate doses.

Some contractors missed it, but others suffered each time. Raging streams washed out fills and pipe lines and demolished half-built bridges.

It's all over now. Contractors are working hard, and the outlines of a first-class new superhighway begin to show. The road runs through beautiful country, but it's country that presents some tough construction problems. Some areas are rugged; others, flat. Still others are typical, rolling New England countryside. Throughout, there are generous portions of rock, earth, sand, boulders, and muck.

The western end of the 123-mi job begins in the foothills of the

SCRAPER FLEET cuts through big gravel hills near western end of Turnpike. With average haul of 1,500 ft, twenty 18-yd scrapers move 32,000 yd per 10-hr day. Contractor on 11-mi stretch is B. Perini & Sons. Job requires 3½ million yd of earth excavation.

Giant Tractors Cut Loading Time in Half

King-size tractors are worth the extra cost, according to Perini. With power and speed to spare, they push-load a scraper in half the normal time, and practically pay for themselves just in tire savings alone.

Perini's Caterpillar D9 and Euclid TC-12 heap an 18-yd scraper with gravel in only 45 sec.

TWIN-ENGINED Euclid TC-12 is ideal for push-loading. Two 194-hp engines with Torqmatic drives produce a smooth, steady thrust. Good maneuverability is result of separate engine for each track.

Berkshire Mountains. Some parts are solid rock; others are nearly all gravel; many areas consist of earth interspersed with boulders. Where there are lots of boulders, contractors can't use scrapers, and shovels make slow progress. One contractor has four 2½-yd shovels in a heavy boulder area averaging less than 3,600 yd in a 10-hr day. It's slow, but it's the only way to handle the job.

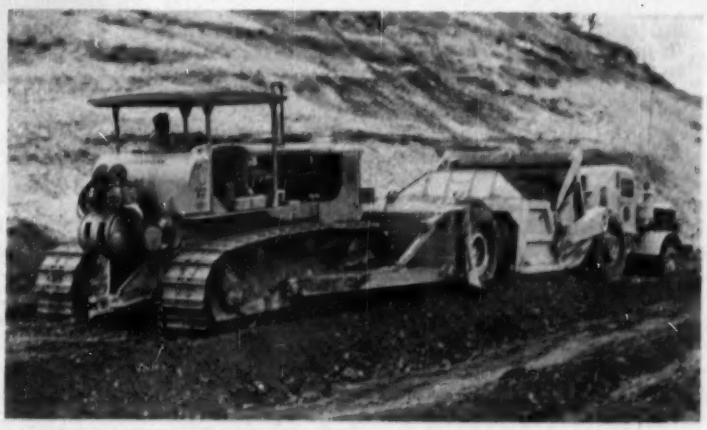
Scraper Fleets

Big gravel cuts are a lesser problem. A few miles from the New York State line, B. Perini & sons, Inc., is doing a fast job of leveling some high gravel hills. With a fleet of 20 scrapers, his production is an impressive 32,000 yd per 10-hr day. There's good reason for it; he's got some of the biggest pushers ever made.

Further east, the Turnpike enters its most rugged stretch-through the heart of the Berkshire Mountains. For 15 mi, it's virtually all rock. Some cuts are more than 100 ft deep, and one fill rises 175 ft above the base of a steep ravine. Here's one place where the floods took their toll.

When Hurricane Diane hit in August, S. J. Groves & Sons had just completed the erection of twin 126-in. dia Armco Multiplate pipes at the base of the ravine. Only a small amount of fill had been placed over them. When Diane turned a normally peaceful brook into a raging torrent, the pipes

BIG PUSHERS work side by side in 250,000-yd gravel cut. Allis-Chalmers HD21 (foreground) and Caterpillar D9 push-load 18-yd Euclid scrapers. Thick gravel deposits run out just east of Perini's job and turn into earth interspersed with boulders.

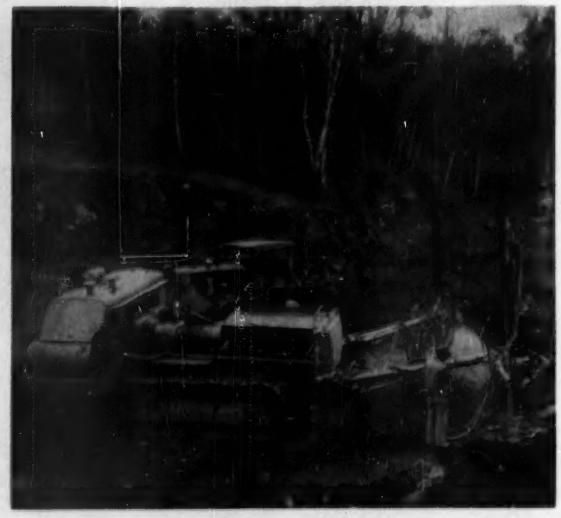


CATERPILLAR D9 loads Euclid scraper in 45 sec. Power comes from single 286-hp diesel engine with turbocharger. Dozer blade is attached because rig also handles other operations on the job. Cost is about a third more than D8.

On Mass. Pike . . . Track Boosts Drill Mobility

GARDNER DENVER Air-Trac drills 3½-in. blast holes at rate of better than 35 ft per hr. Common hole depth is 25 ft. Air motor on each track provides power for climbing and pulling compressor.

JOY Challenger mounted on old tractor drills 4-in. holes 10 ft deep for making side-hill shot. On vertical drilling, rig can drill 300 ft in 10-hr day. It pays off on holes deeper than 20 ft.



INGERSOLL-RAND unit mounting 600-cfm compressor on back of D8 tractor is highly maneuverable. Twin drills, feeds, and hydraulically actuated booms are operated from control panels on booms.

MASSACHUSETTS TURNPIKE . . . (Continued from page 53)

were dragged 1,000 ft downstream.

During the next month most of the Multiplate sections were salvaged, reassembled, and partially covered with fill. Then flood No. 2 arrived. This time the fill held, but several hundred feet of exposed pipe bowed up and cut off the flow. The river backed up and threatened to wash away the fill. Groves had no choice. He blasted the bowed-up sections, and the torrent raced under the fill. Today, the pipe is completely covered and no longer vulnerable.

Except during the floods, Groves has made fast progress. The job has 4,200,000 yd of excavation, half rock and half earth. He is moving 25,000 yd per 10-hr day. Major equipment includes two Bucyrus-Erie 4½-yd shovels, three Northwest 2½-yd shovels, two Bucyrus Erie 2½-yd shovels, and 12 scrapers. Hauling fleet consists of 32 end-dump Euclids and four bottom-dump units. He uses 32 dozers, 20 wagon drills, and 12 Air-Trac drills.

Groves's job terminates near the Westfield River, site of one of the Turnpike's most unusual structures—a high-level, deck-truss bridge standing 250 ft above water. It has an abutment perched near the top of each ridge, and only one pier between them in the river. The rock cliff on the east side of the river is so steep that ready-

On Mass. Pike... Shovels and Trucks are Workhorses...

BUCKET on big Marion shovel drops 4-yd of shattered rock into Euclid truck on job near Worcester. Two tractor-mounted rigs each supporting two drills keep ahead of shovel in soft rock.

DEEP CUT is excavated by Bucyrus-Erie 4-yd shovel and fleet of Eucs. Six Air-Trac drills on top of cut account for 6,000 yd per shift. Fleet of Jeeps carries men over rugged roads.

HARD ROCK makes tough going for Lizza & Sons in western section of Turnpike. It takes rugged team like this Northwest 2½-yd shovel and Euclid truck. Job also has lots of muck.

BOULDERS mixed in with earth rule out scrapers on many sections of job. Shovel and truck combinations, like this Bucyrus-Erie 51B and 10-wheel Mack end-dump, work these sections.

mix trucks can't manage the haul road under their own power. A tractor's winch-line keeps them from falling off while they supply a crane with concrete.

Nearly 200 ft below at the river, conditions are completely different. In fact, the big problem, once again, was the floods. Three times the river topped the sheet-pile cofferdam, pouring water, dirt, and debris into the hole and washing away the working ramp.

The first time, Daniel O'Connell's Sons, Inc., removed 12 ft of debris with clamshells. The second flood dumped in another 8 ft, but piles already had been driven, and a clamshell wouldn't fit between them. Instead, O'Connell quickly built a 10-in. air lift and powered it with 2,300 ft of air. Only 3 ft of debris remained after the third flood. But, by this time, the reinforcing mesh was in place. It was a tough job to clean between the steel bars. Much of it was done by hand.

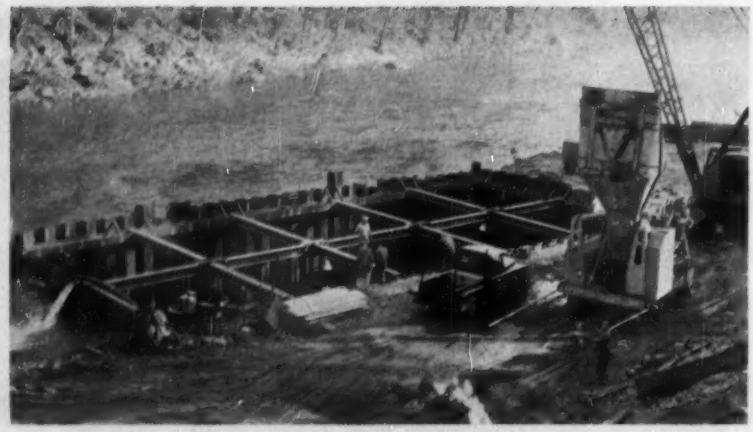
Except for the floods, the pier-building job went smoothly. More than 300 H-piles were driven nearly 100 ft to refusal and capped with an 8-ft tremie seal. The cofferdam was dewatered, and a 10-ft footing placed on top. Over the footing, a shaft will rise 82 ft to support steel trusswork.

East of the Westfield River, the land flattens out for about 25 mi. Scrapers again enter the scene, supplemented in some areas by loader spreads. The contractors include Lane, Henley Lundgren, Grandview, and DeFelice.

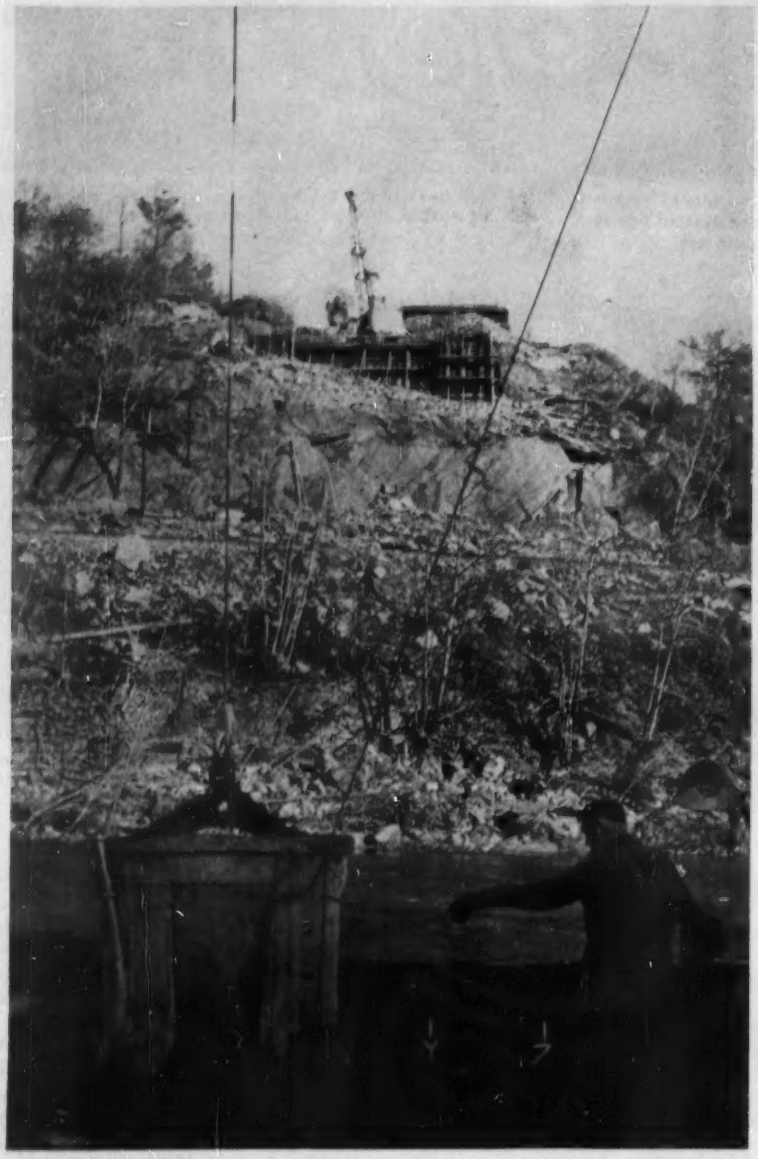
(Continued on next page)

On Mass. Pike...
Bridges Are Tough

Opposite problems. Contractor fights floods at cofferdam level, while he builds abutment on side of steep cliff.



COFFERDAM for single pier in Westfield River is poured by crane and bucket. Koehring paver supplies concrete. Floods inundated sheet-pile structure three times, filling it with thick layers of silt and debris and washing out working ramp.



TWO EXTREMES in concrete placing. Below, crews rush to complete pier foundation before another flood overflows into cofferdam. Nearly 200 ft above, crane perched on abutment waits while ready-mix truck is backed down a steep haul road by tractor's winch cable.

MASSACHUSETTS TURNPIKE . . .

Continued from page 55

But the smooth ground soon changes to rolling hills. This is the type of terrain encountered on the rest of the Turnpike. It offers plenty of work for scraper fleets and even more for shovels and trucks.

Bridges also become big factors in the built-up area at the eastern end of the turnpike. C. J. Langenfelder's 5.4-mi section near Worcester requires more than 40,000 yd of concrete for structures. This contract is $8,750,000, and more than $3 million of it goes into bridges.

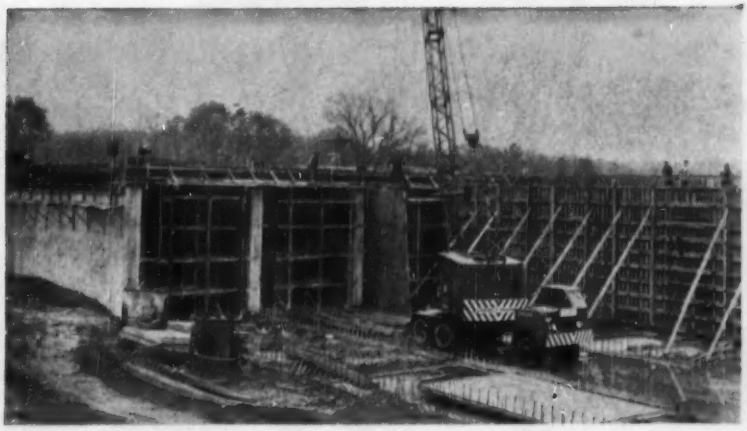
Misses Floods

Langenfelder had a lucky break with the flood. Because of the steel shortage, he had to postpone bridge construction. When the first flood hit, he was still waiting for steel. By the second flood, he had poured all his foundations high enough to avoid damage.

With his bridges out of danger and on schedule, Langenfelder concentrates now on getting top production from his earthmoving fleet.

The job calls for about 2 million yd of earth and 1 million yd of rock excavation. To eliminate the problem of determining what is rock and what is earth, he bid them both at 87c per yd. He's gambling on finding more earth than originally estimated.

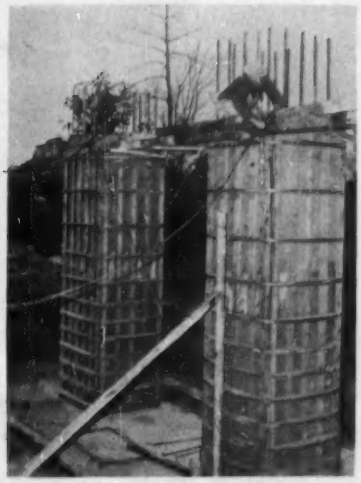
To move the 3 million yd on an accelerated basis the contractor works a sizable equipment fleet. Heading the list is a Marion 4-yd shovel, a Lima 3-yd shovel, and a Northwest 2½-yd shovel. Scraper



Form Tricks

Here's how Consolidated Builders, Inc., top-notch bridge firm, cuts cost on 13 Turnpike structures.

HUGE BOX CULVERT 263 ft long has four 18x20-ft cells and contains 8,700 yd of concrete. Prefabricated plywood wall panels are reused 10 times. Permanent hooks on 6x6 strongbacks speed handling. Panels are placed by Link-Belt crane.



METAL STRAPPING around column form is fast to place and strip. Form, made of plywood panels and circular ribs, is assembled flat and hoisted in place over reinforcing. Yoke connecting tops of columns is guyed to temporary concrete deadmen.

fleet consists of four Caterpillar and four Euclid units. In a 10-hr day, they move 11,000 yd of dirt and 3,000 yd of rock.

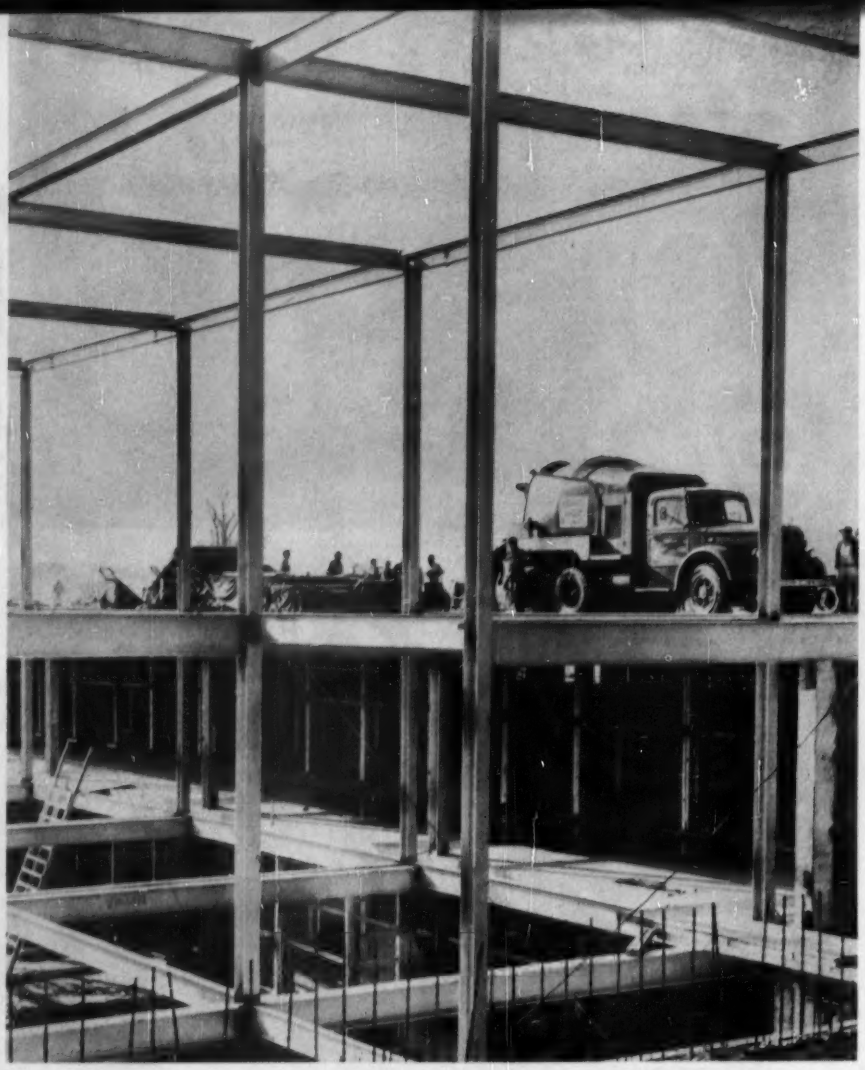
Other contractors in the area include Brunalli, Orlando, Clark, Farrell & Rodgers, Nello Teer, Gilbane, DeMatteo, and White.

When the grading is completed next spring, contractors will have moved 28.5 million cu yd of earth, 6.5 million yd of rock, and 15.25 million cu yd of borrow. Blacktop paving will be in full swing next summer. The job is scheduled for completion by the end of next year.

Philip H. Kitfield is chief engineer, and William C. Tuttle is construction engineer for the Massachusetts Turnpike Authority. General consultant is Howard, Needles, Tammen & Bergendoff.

COLUMN CAP is supported on Universal steel scaffolds. They are fast and easy to erect, provide close adjustment, and are reused almost indefinitely. Bottom section rests on steel beams placed over footing. Angles brace scaffolds.

First Half Of Roof Slab Is Truck Road To Second



CONCRETE TRUCK backs over first half of roof slab to pour the second half. Unique roof-top pour saved hauling in buggies and resulted in $1 cu yd handling cost.

A HAPPY COMBINATION of circumstances made it possible for William L. Crowe Construction Co. to pour a 5½-acre roof slab twice as fast and at half the handling cost usual for such a job.

Crowe's job was the $10 million Mandawmin shopping center in Baltimore, Md. Mandawmin is a two-level shopping center designed with an extra-thick roof slab so that the roof may serve as a parking area to accommodate 4,100 cars. A hill alongside the building provided a ready-made approach to the roof-top parking lot. Only a little backfilling was needed to close the gap between the building and the side of the hill.

For Crowe, the hill was a real gift of nature. Project superintendent Edward F. Pond used the hill to help him pour 400 cu yd of concrete a day and cut handling costs to $1 per cu yd.

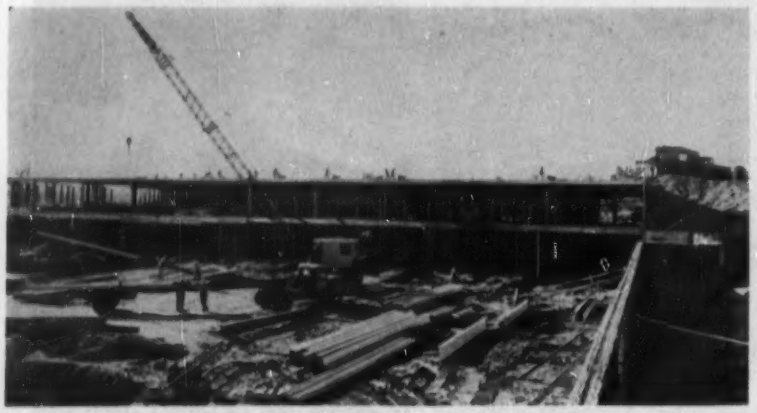
First, Pond mounted chutes on the hill. The elevation provided a 45 deg incline which made it possible to chute concrete for the lower slabs distances of up to 300 ft.

After completing the second floor slab, Pond formed for the half of the 13½-in.-thick roof slab nearest the hill using Baker-Roos adjustable shores 9 ft on centers for support. Then, he backfilled the area between the building and the hill so that trucks could back up to the roof to make the pour.

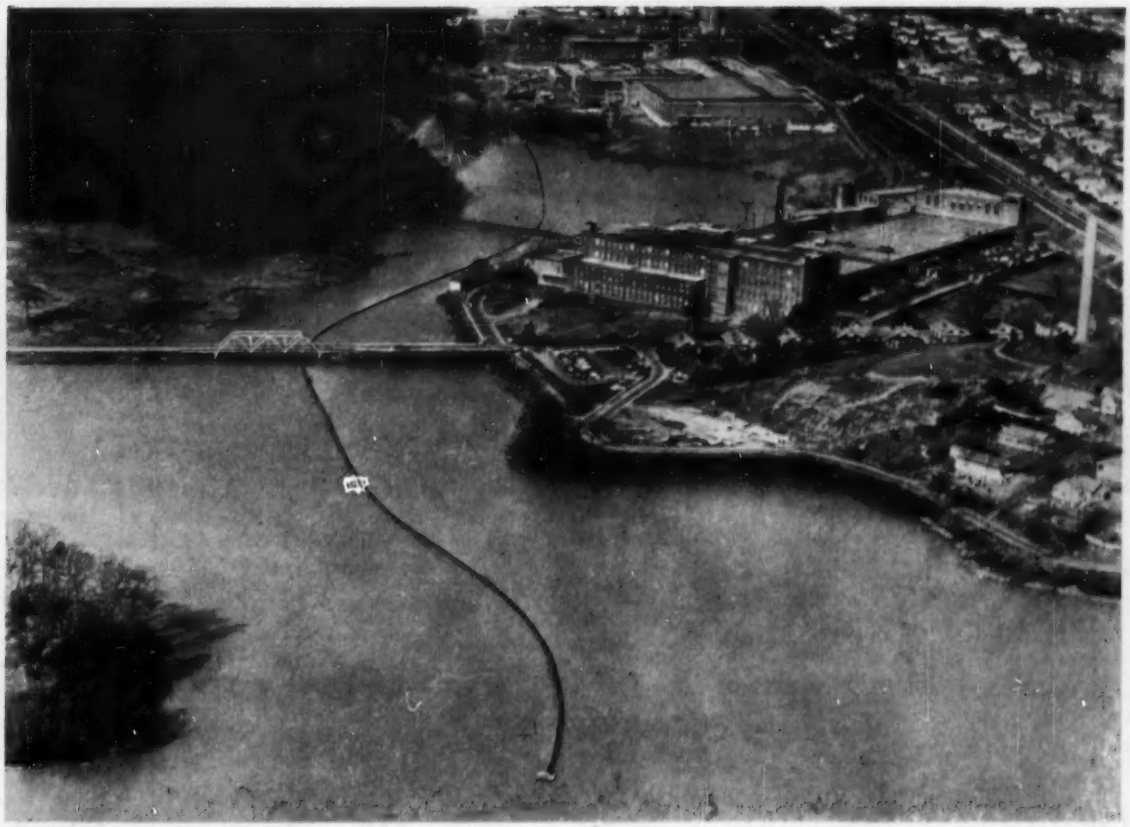
Transit-mix trucks discharged into two 5 cu yd double discharge Garbro hoppers at the edge of the building. Rubber-tired buggies moved the concrete to the pour area where it was spread and vibrated. A 10,000-ft section was poured daily.

After a seven-day set, the concrete tested between 2,700 and 3,500 psi. So Pond supplemented the regular shoring with 8x8-in. posts spaced 13 to 15 ft on centers and rolled transit-mix trucks across the first half of the slab to pour the second half.

This simple, but ingenious, method enabled Crowe to maintain a weekly pour rate of 2,000 cu yd and complete the 10,000 cu yd slab pour within five weeks.



CONVENIENT HILL adjacent to building—after backfilling—gives trucks access to roof. Additional shoring helps support slab. Contractor poured 400 cu yd daily.



PIPE FLOATS on the water, its end supported by a raft. The line remained on the water for more than three weeks before its assembly was completed, but no serious leaks developed. Joints are made with 2-ft one-piece bands and six threaded rod hoops.

FOUR MEN, with the help of a crane, easily push the line out farther into the water after each new 18-ft length of pipe is added.

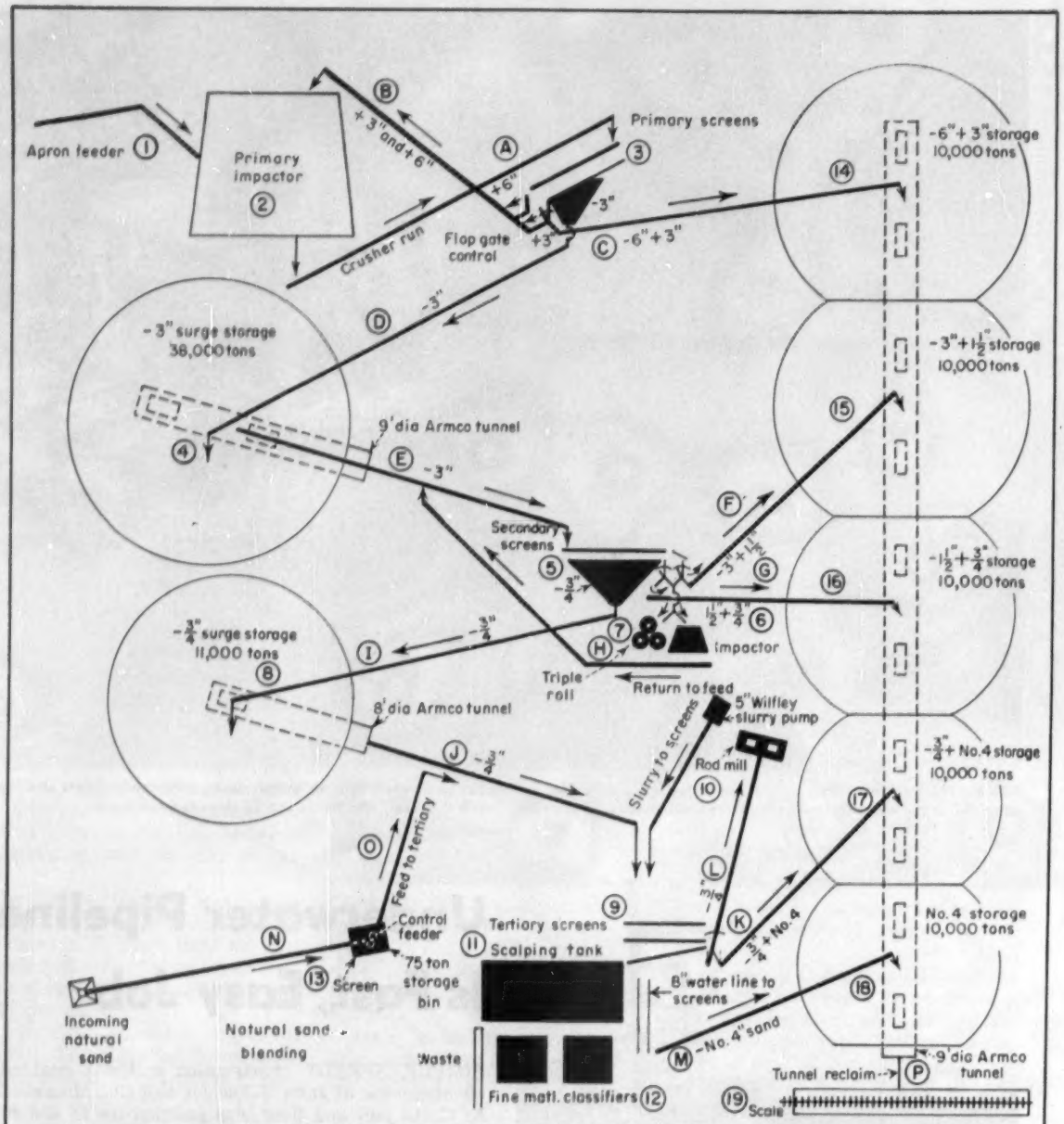
Underwater Pipeline Is Fast, Easy Job

SIMPLE, SPEEDY construction methods enabled a 10-man crew of John V. Barger and Co., Mooresville, N. C., to join and float into position up to 400 ft of 24-in. pipe for an underwater effluent line in a normal 8-hr working day.

The line carries waste from the dye plant of Burlington Industries, Inc., in Cramerton, N. C., 3,720 ft into the channel of the Catawba River. The first 500 ft is underground from the plant to the bank of the river; the remainder is under water. Armco asbestos-bonded, asphalt-coated pipe was used.

Workmen assembled the line in 18-ft lengths on the shore and pushed it out into the water as each joint was made. The open end of the first length was fitted with a watertight wood plug and supported on a raft to keep it above water.

Four men, with the aid of a crane, were able to push the line out into the water as each new 18-ft section was added. The crew consisted of a foreman, a crane operator, four laborers on the shore, and a man in a boat to guide the forward end of the line and position it with guy wires. When the entire line was in position, the plug was removed and the pipe sunk.



CONVEYORS			
A	48" x 190'	crusher run	— impactor to primary screens
B	36" x 185'	+6" and +3"	— primary screens to impactor
C	30" x 189'	−6" +3"	— primary to finished storage
D	42" x 218'	−3"	— primary to surge pile
E	36" x 178'	−3"	— surge to secondary
F	30" x 175'	−3 +1½	— secondary to finished storage
G	24" x 163'	−1½ +¾	— secondary to finished storage
H	24" x 86'	crusher run	— secondary to secondary feed
I	30" x 218'	−¾	— secondary to surge
J	30" x 155'	−¾	— surge to tertiary
K	24" x 145'	−¾ + No. 4	— tertiary to finished storage
L	24" x 75'	−¾	— tertiary to rod mill
M	24" x 212'	−No. 4 sand	— tertiary to finished storage
N	24" x 125'	natural sand	— incoming to bin
O	18" x 80'	natural sand	— bin to tertiary feed
P	42" x 503'	all	— Reclaiming

* Twelve Barber-Green; three Pioneer; two Link Belt; all Goodyear belting.

PLANT EQUIPMENT		
1	50" x 14½'	Cedarapids heavy duty apron feeder
2	5360 H	Cedarapids impactor
3	5' x 12'	Pioneer double deck screen (two)
4	48" x 60"	Syntron feeder (two)
5	4' x 12'	Cedarapids double-deck screen (three)
6	3030	Cedarapids impactor
7	5424	Pioneer triple roll crusher
8	42" x 60"	Syntron feeder
9	4' x 14'	Cedarapids double-deck screen (four)
10	8' x 12'	Marcy rod mill
11	32'	Eagle water scalping tank
12	36" x 25'	Eagle double fine matl. classifier (two)
13	4' x 12'	Pioneer screen
14	48" x 72"	Syntron F55 feeder (two)
15	48" x 72"	Syntron F55 feeder (two)
16	48" x 60"	Syntron F55 feeder (two)
17	48" x 60"	Syntron F55 feeder (two)
18	48" x 60"	Syntron F55 feeder (two)
19	100-ton	Howe track scale

AT CONTRACTOR'S QUARRY, 6¼-in. blast holes put down by rotary drill are loaded with 5-in., 25-lb powder cartridges. While big electric-drive rig drills for next lift, shovels load-out blasted rock. Crane handles secondary breakage with drop ball.

Flexible Plant Pours Out the Aggregate

IF YOU EVER have to produce a lot of aggregate in a hurry, you might learn some useful tricks from the setup that is supplying some of the St. Lawrence Seaway-Power projects. Installed by joint-venture contractors Tecon-Grafe-Parsons, the plant produces four sizes of crushed stone plus sand at an average top output of 700 tph. Surges hit 1,000 tph.

Flexibility is the plant's prime feature. Note the many flop gates in the accompanying diagram. They help make it possible for the plant to meet any gradation desired because they can take out the middle size. In the tertiary, for example, the operator can split the minus 3/4 on the 3/8 and, by flop gate, route material to the rod mill or pick off the No. 4.

Note also the closed circuiting throughout the plant: The operator can reach any size and reduce it further. The whole plant is interlocked within three sections, independent of each other. And extra-large surge storage capacity lets other sections of the plant continue to operate should one section have to shut down.

But surge storage is not the only large thing on the job. In the quarry alongside the crusher installation, a Joy Heavyweight Champion puts down 6¼-in. blast holes through the hard dolomitic limestone that feeds the plant. It drills 30 ft deep on 20-ft centers, with 17 ft of burden. Holes are loaded with 5-in. by 25-lb cartridges of Atlas Apex No. 3 powder and fired by Rockmaster caps. Powder ratio: 0.33 lb per ton. Fragmentation is good. A Unit crane with ball handles what little secondary breaking is required. Blasted rock, 48-in. maximum size, is loaded by Northwest 80-D and No. 6 shovels into Euclid rear dumps for the short haul to the plant.

Trucks dump into a concrete pit over a Cedarapids apron feeder leading to a Cedarapids 5360 impactor. Material from this crusher goes to a double-deck Pioneer primary screen. Here, 6-in. specification material is sent to stockpile, and oversize (along with some 3-in. plus when its products are needed farther along

TABLE I
MANUFACTURED SAND

Screen No. (U.S. Std. sq. mesh)	% Passing (by weight)
4	95-100
8	75-90
16	50-70
30	30-50
50	15-30
100	5-10
200	max. 60% of -100

Fineness modulus 2.50-2.90

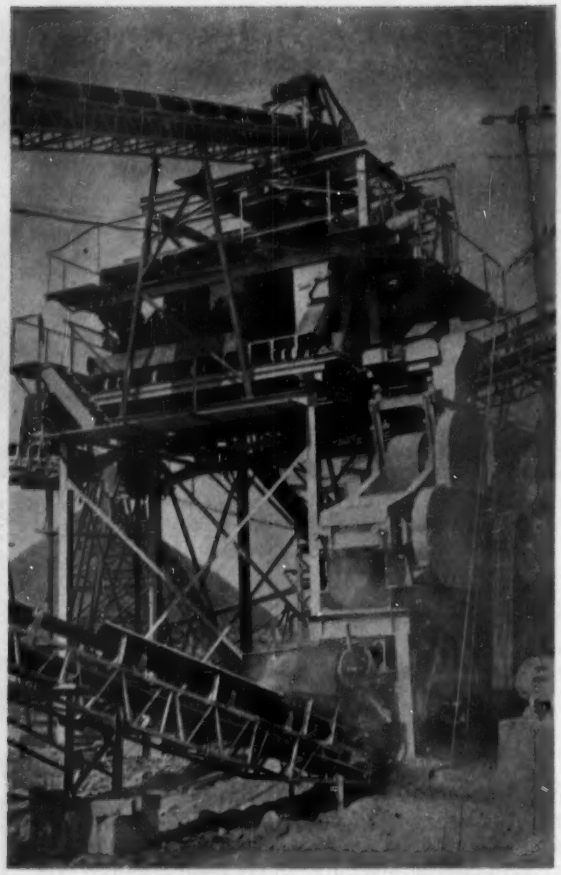
TABLE II
CRUSHED STONE AGGREGATE

Sieve Size (U.S. Std. sq. mesh)	% Passing (by Weight)			
	⅜"-¾"	¾"-1½"	1½"-3"	3"-6"
7-in.				100
6-in.				90-100
4-in.			100	20-45
3-in.			90-100	0-15
2-in.		100	20-55	
1½-in		90-100	0-15	
1-in.	100	20-55		
3/4-in.	90-100	0-15	0-5	
3/8-in.	20-55	0-5		
No. 4	0-5			

AGGREGATE PLANT...
Continued

QUARRY-RUN ROCK goes into pit over apron conveyor to 5360 primary impact breaker. Crusher-run goes to screens at rear.

CONVEYOR TO SURGE PILE is center-drive unit (motor at right). Those to finished storage (rear) cantilever on inverted trusses.



SECONDARY CRUSHING is handled by 5424 triple roll and 3030 impactor. Note splitter chutes and flop gates at screens above.

in the process) is returned to the impactor for further reduction.

Minus 3-in. from primary screening goes to a 38,000-ton surge storage pile. A tunnel conveyor from this feeds a secondary crushing unit that includes three Cedarapids double-deck screens, a Pioneer 5424 triple roll crusher and a Cedarapids 3030 impactor. The secondary setup routes 3-in. aggregate to stockpile, or to either of its two crushers and thence back to feed. Minus 3/4-in. goes to an 11,000-ton surge pile.

A tertiary unit, supplied from surge pile, produces fine aggregate and manufactured sand. It includes four Cedarapids double-deck screens, a Marcy 8x12-ft rod mill, an Eagle 32-ft water scalping tank, and two Eagle 36-in. by 25-ft double screw classifiers.

Manufactured sand is deficient in the finer sizes. So, to avoid the extra expense of producing these mechanically, fine natural sand that is abundant in the area is trucked in from a near-by pit in 10- and 15-yd Euclids. This blending sand goes into the process with the tertiary feed. Wash water for processing all sand comes from a man-made pond, from which it is recirculated after solids settle out.

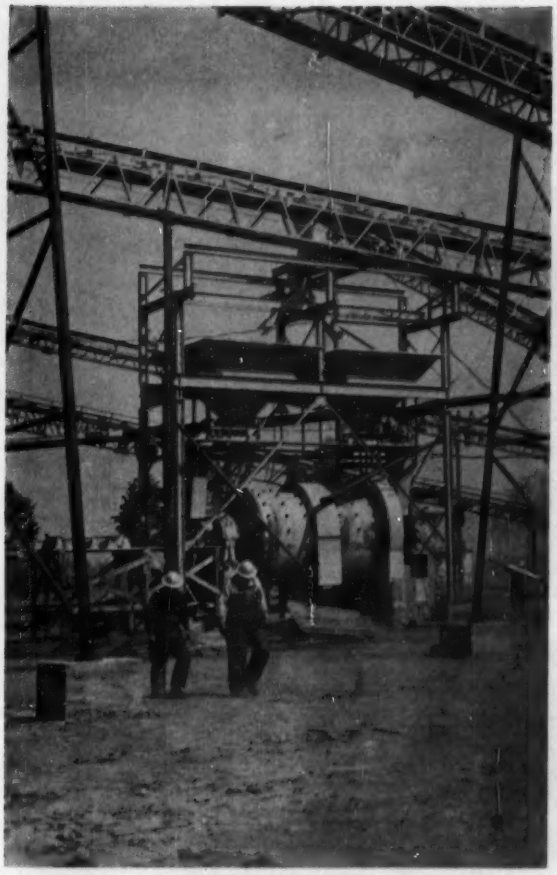
Conveyors that stack finished aggregate and sand are unusual. They are cantilevered over the 10,000-ton stockpiles on inverted trusses supported by pipe-frame legs. While the latter are not completely clear of the piles, their round shape (rather than the usual WF beams) minimizes unbalancing pressure of the stone.

Beneath the stockpiles extends a 500-ft reclaiming belt in a 9-ft Armco tunnel. Two Syntron feeders under each pile feed the 42-in. belt. To prevent errors, an electric locking system makes it impossible to operate feeders for more than one size aggregate at one time. When blending of two or more aggregates by simultaneous loading-out is desired, switches must be unlocked with a guarded key.

The reclaiming belt feeds a loading conveyor and chute system that dumps either into railroad cars or trucks. Like the rest of the plant, the reclaiming system is interlocked so that the last operation starts first, then prior ones can be cut in. Thus, only when the final delivery belt is moving can the reclaiming belt be started, then the feeder. For rail haul, by which most of the aggregate is being delivered to New York State Power Authority contractors, 70-ton hopper cars are switched in Tecon-Grafe-Parson's yard by General Electric 80-ton diesel locomotive.

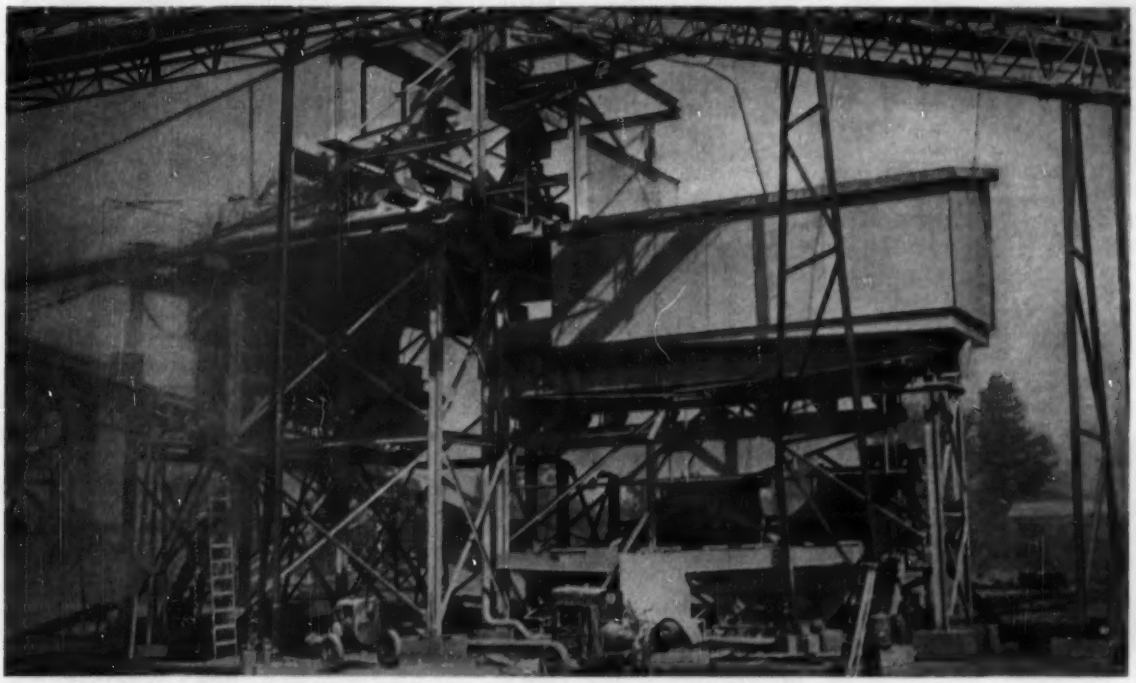
The plant is all electrically driven with a total 2,000 hp installed. Motors 75 hp and up operate at 2,300 v, smaller ones at 440.

This fine aggregate setup near Massena, N.Y., is scheduled to produce a minimum of 2,480,000 tons of crushed rock and 950,000 tons of sand. Chances are it will turn out much more. Running the operation is "Casey" Gravenhorst, project manager for the joint venture of Tecon Corp., Dallas; Grafe-Callahan Construction Co, Los Angeles; Ralph M. Parsons Co., Los Angeles. "Red" York is superintendent, Bob Ellingson is assistant, and Elmer Clausen is office manager.

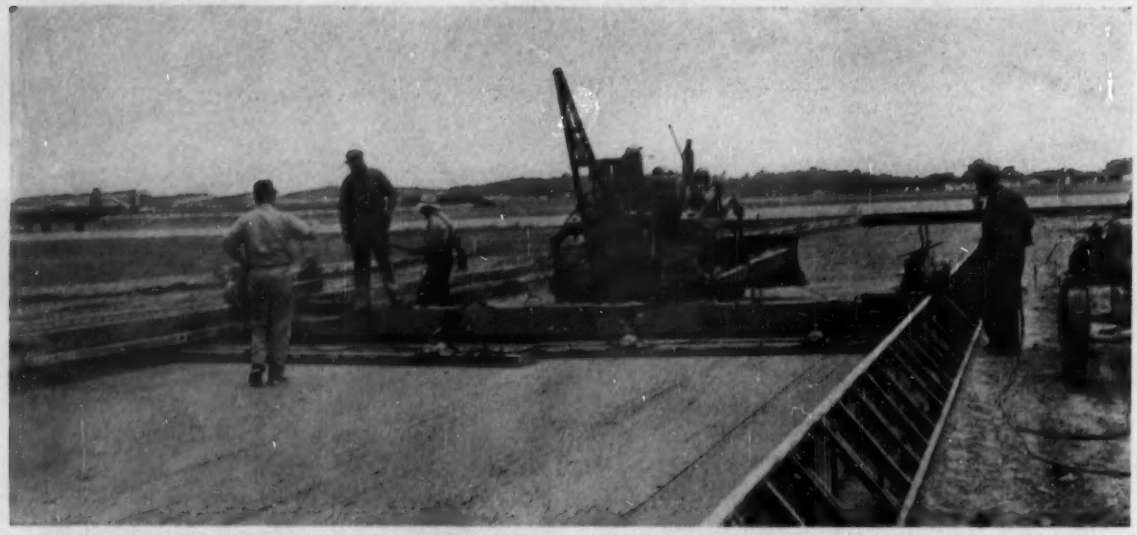


SAND MANUFACTURE takes place in 8x12-ft center-peripheral-discharge rod mill. Pump returns slurry to water scalping tank.

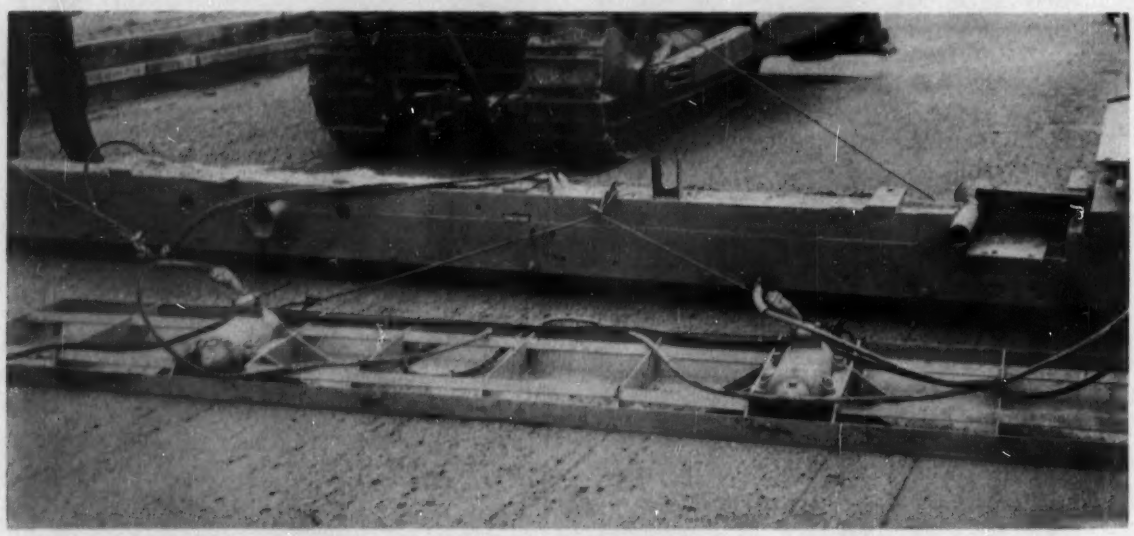
NATURAL SAND is added to overcome deficiency of fines in manufactured product. This setup feeds it to tertiary conveyor.



TERTIARY UNIT also includes four 4x14-ft double screens, one 32-ft scalping tank, and two 3x25-ft double screw classifiers. Entire plant is quite compact, but requires nearly 3,000 ft of conveyors. Electrically driven, plant has 2,000 hp installed.



TWO SLED-LIKE UNITS, made of ¼-in. steel plate and mounting Jackson vibrator motors, compact sand subbase for concrete pavement. Electric power is supplied by portable generating set. Job is at Offutt Air Force Base near Omaha, Nebraska.



TRACTOR-DRAWN SCREED planes surface as vibrating unit compacts sand base. Bars stiffen 12-ft long plates. Contractor, Hallett Construction Co. of Crosby, Minn., built rig after both steel and rubber-tired rollers proved unsatisfactory.

Job-Built Vibrating Plates Compact Granular Subbase

TWO STEEL PLATES, each mounting two Jackson vibrator motors, are doing a fast job of compacting a sand and gravel subbase for concrete pavement at Offutt Air Force Base, Neb.

They are made of ½-in. plate, turned up in front like a sled and stiffened by bars placed 1 ft apart. Each unit is 12 ft long and 2 ft wide. Pulled behind a tractor-drawn screed, the two plates thoroughly compact a 4-in. thick course of sand and gravel 24 ft wide. They overlap a few inches at the center to take up any slight variation in the width of the slab.

The rig was job-built by Hallett Construction Co. of Crosby, Minn., after both steel and rubber-tired rollers proved unsatisfactory. Wilford Aspholm is vice-president, and Robert McConnell is superintendent for the company. Capt. John McElhenny is area engineer for the Corps of Engineers, U.S. Army.

STUDS WELDED Electrically operated gun fixes composite aluminum stud to steel framework of structure.

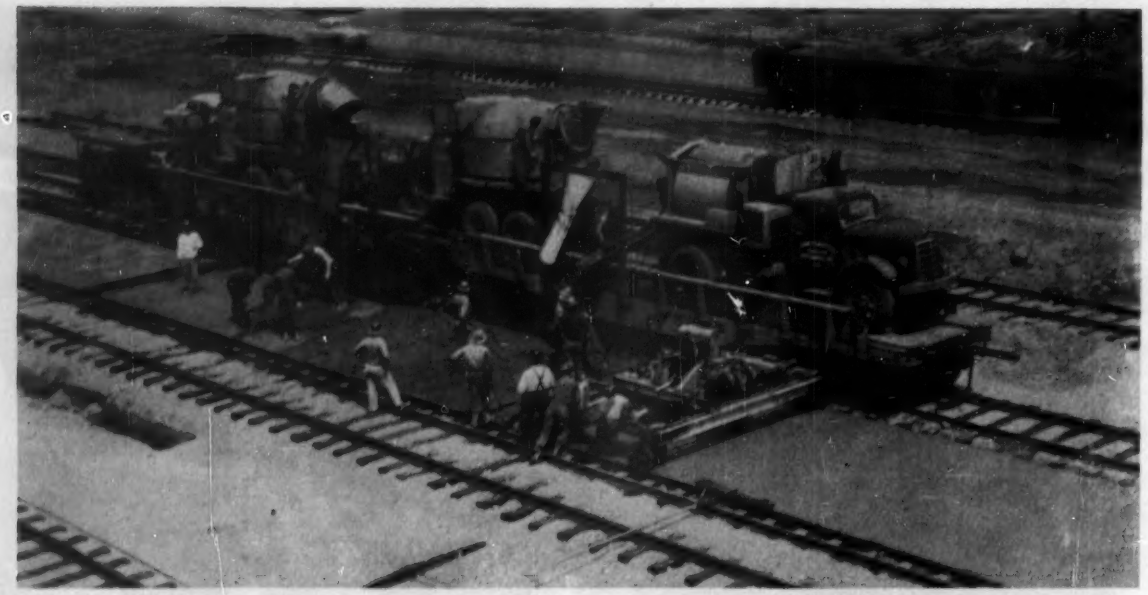
SHEETING FASTENED Corrugated aluminum sheeting is driven in place with rubber hammers, and then studs are upset.

Welded Studs Fasten Sheeting

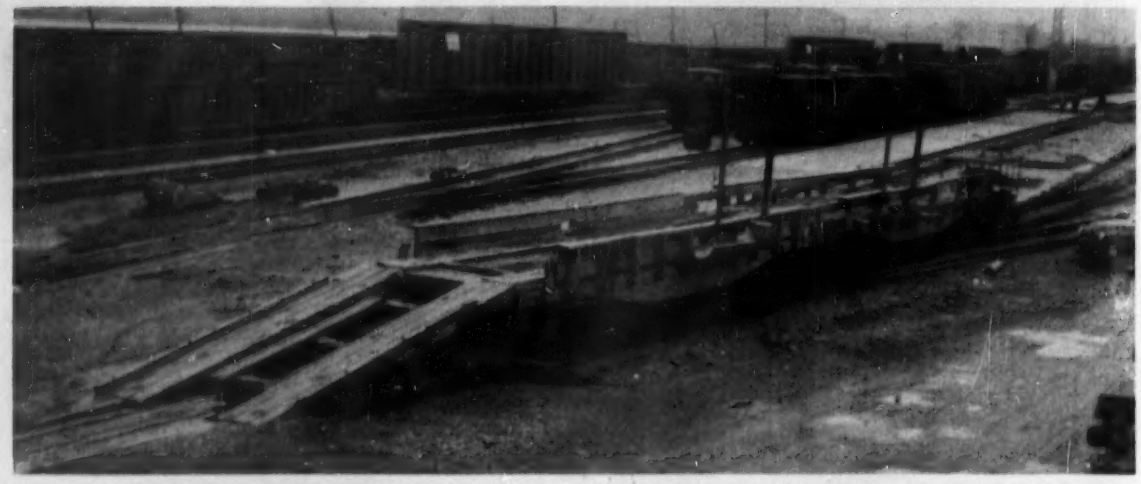
END-WELDED composite aluminum studs slashed labor costs on the sheeting of a dome-shaped warehouse in Long Beach, Calif. Workmen climbed over steel framework and welded thousands of studs with two Nelson guns. They placed corrugated aluminum sheeting and drove it down over the studs with rubber-faced hammers, then upset the studs. No interior scaffolding was required.

To prevent any electrolytic action between sheeting and steel framework, the portion of the studs that comes in contact with the sheeting is aluminum. Contractor was Mitchell Steel, Inc., of Torrance, Calif. Designer was Kaiser Engineers of Oakland, Calif. M. M. Walker was superintendent for the contractor.

DOME COMPLETED Bulk storage warehouse has smooth finish because end-welded studs are almost invisible. Studs are composite aluminum.



CONCRETE SUPPLY TRAIN carries three 5-yd transit-mix trucks to dump ahead of finishing machine on railroad-yard paving job. With this piggy back concreting scheme, Pittsburgh's John F. Casey Co. pours 45 yd per hour on 6,000-ft round-trip haul.



TRUCK LOADING RAMP of heavy timber lets mixer trucks mount flatcars which are fitted with concrete chutes and gantries for handling them. Setup was devised to take concrete through busy section of yard to point of discharge. (R. O. Griffith photos)

Piggy-Back Trucks Pave Rail Yard

AN ADAPTATION of railroading's newest wrinkle, piggy-back truck-train haul, has paid off for John F. Casey Co. The Pittsburgh contractor ran his transit mixers on to a string of flatcars and, appropriately enough, used the setup to pave a railroad yard.

Casey's job was to pave between several parallel tracks at the Pennsylvania Railroad's Conway, Pa., classification yard. Congestion in the yard threatened to slow the work. So Casey's superintendent, J. R. Johnston, hit on the interesting piggy-back scheme.

He coupled two flatcars together and placed decking between them to bridge the gap. The two cars were capable of carrying three 5-yd Blaw-Knox transit mixers on Mack trucks which mounted the cars over a special timber ramp. A Plymouth BL gasoline-powered locomotive hauled the concreting train without difficulty through the congested area between the loading point and the pour. At the point of discharge, slings from gantry frames built on to the sides of the flatcars handled chutes that directed concrete as required. On the subgrade, the mix was smoothed by a Blaw-Knox finishing machine and hand floated.

Longest haul was some 3,000 ft one way, and required 20 min for the round trip. Thus, with three 5-yd loads per trip, the piggy-back setup poured 45 yd per hr. Clint Mumma was concrete foreman for Casey, and R. O. Griffith was project engineer.

"I'VE BEEN MOVING DIRT SINCE 1936 AND TRIED ABOUT ALL KINDS OF EQUIPMENT. I'VE FOUND THAT **CAT*** EQUIPMENT ALWAYS COULD GO WHERE OTHER MOTOR GRADERS AND TRACTORS COULDN'T—AND STAYED ON THE JOB DAY AFTER DAY WITH PRACTICALLY NO ATTENTION EXCEPT FOR GREASING."

A. H. HOUSE, Superintendent for M. E. Ruby, Jr., Austin, Texas

Mr. House, like all construction superintendents, rates his machines by *results*. He's getting them from the Caterpillar No. 12 Motor Grader shown helping build a farm-to-market road near La Grange, Texas.

The big yellow unit is maintaining a haul road for the fast-stepping DW15s and Scrapers. Result: the wheeled rigs are hauling 14 yards per trip on a 2½-mile haul in 12 minutes, including loading and dumping!

The No. 12 is wringing the last cent of economy out of the tractor-scraper teams on the job—helping them haul maximum capacity at the highest possible speed. Tomorrow this rig can be leveling, grading, shaping embankment or sloping fill.

And now the No. 12 can do all its many construction chores *even better*. For it is the first motor grader to be equipped with the exclusive Caterpillar oil clutch. Now disc replacement is practically eliminated and maintenance is greatly reduced. Clutch fade, even under extreme operating conditions, is practically eliminated since the oil bath prevents the plates from heating.

Your Caterpillar Dealer would like to demonstrate these new motor graders on *your* job. Seeing them in action you'll understand how these versatile machines now can give you even more work at lower cost.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

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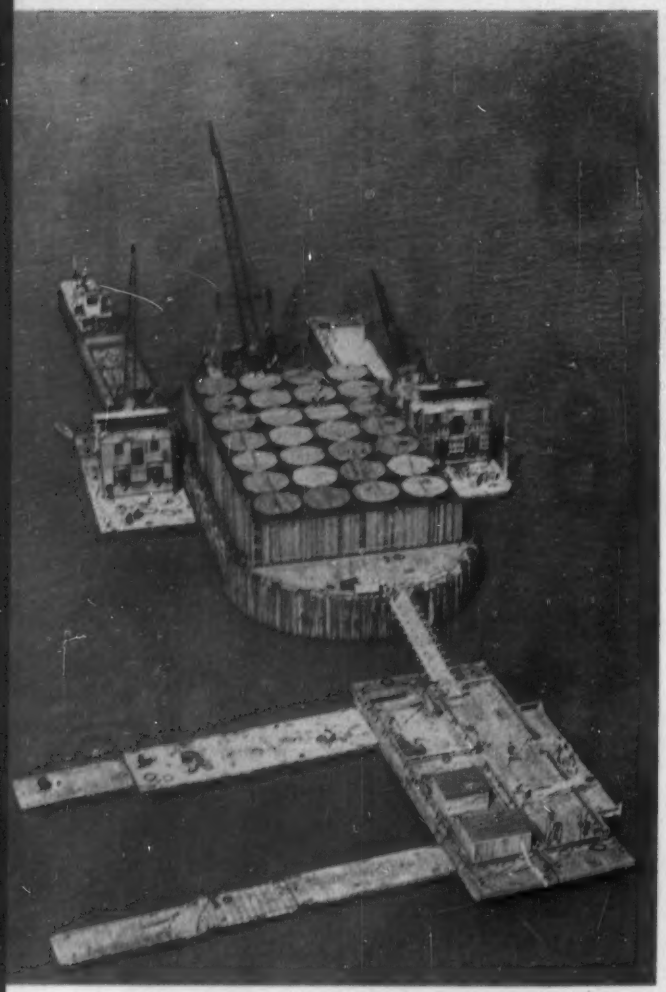
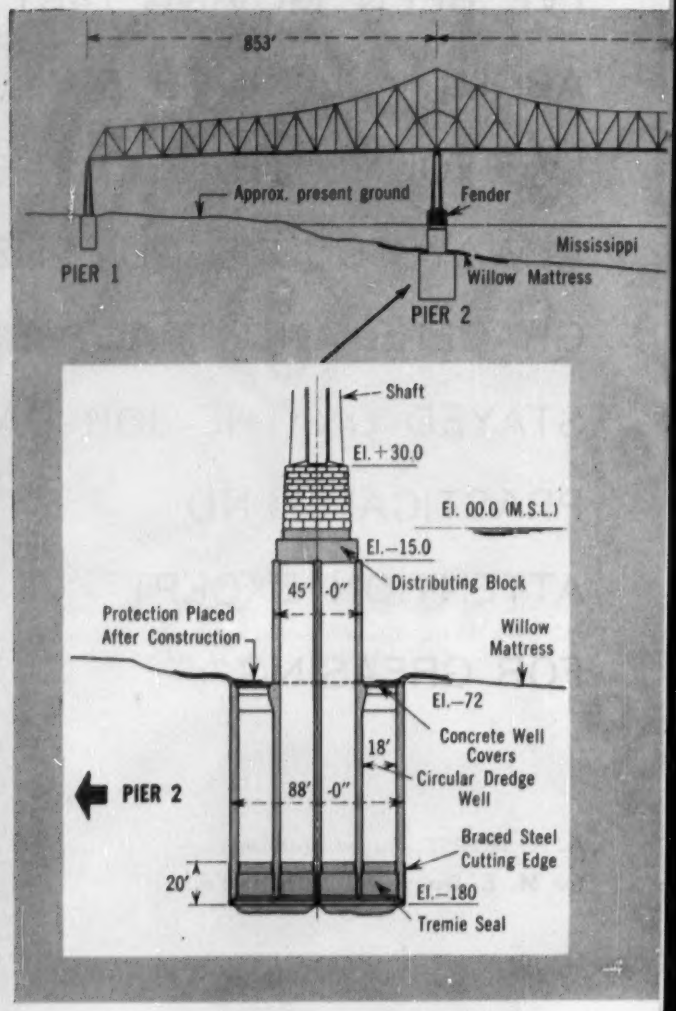
99% OF ALL CAT MOTOR GRADERS ARE STILL IN USE





Floating cranes sink deep-water caison, and . . .

Skilled Bridge Builders

By ALBERT C. SMITH
Associate Editor

DEEP WATER, a shifting bottom, and seasonal floods are only a few reasons why the lower Mississippi River is difficult to bridge. There's lots of river traffic to contend with, too. And bedrock is nowhere to be found.

Despite these problems, a record-breaking bridge is rapidly taking shape near downtown New Orleans, La., and it takes a book of superlatives to describe it. Not only are the pier-supporting caissons among the largest and deepest ever sunk, but the superstructure will be the longest cantilever-type in the country. It has a 1,575-ft main span with two long anchor arms.

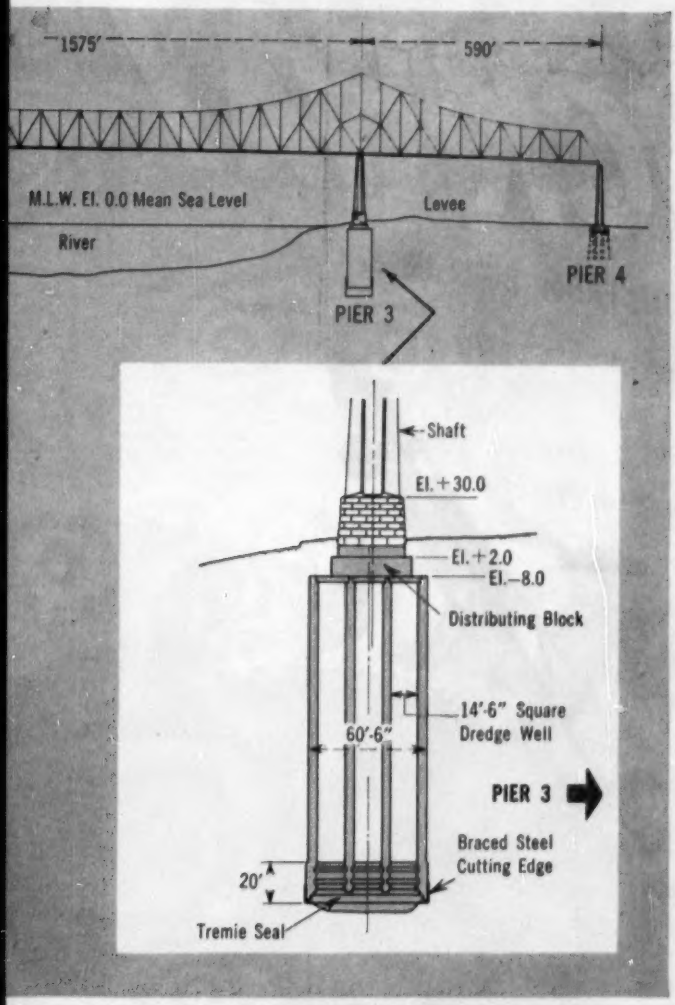
Four huge piers will support the record cantilever. One will be on piles, two on land caissons, and one on a mammoth floating caisson. All three caissons are being sunk by open-dredged methods to stiff gray clay. The river caisson is the deepest, more than 180 ft below mean low water.

It's a job for experts. And some of the best are on the job. Handling the construction of the four main piers is the Dravo Corp. of Pittsburgh, Pa. Modjeski and Masters of Harrisburg, Pa., are consulting engineers for the Mississippi River Bridge Authority. Contract price for the four piers is $6,700,000.

PIER II

By far the most spectacular operation is the sinking of the floating-type caisson for Pier II. It's a tricky job. Construction must be rushed now to get the caisson landed before the high water season. At the same time, closeness to the main navigation channel is an ever-present hazard to both the caisson and the contractor's floating equipment.

The story of Pier II really begins 1,800 mi north of the site at Pittsburgh. Here, a few months ago, a 500-ton floating steel cutting edge was launched on shipways at Dravo's Neville Island plant. (It was named "Highpockets" in honor



cranes on trestles build land caisson as . . .

Conquer "Old Man River"

of J. Smith Miller, pioneer in substructure construction.) The huge box is 88x151 ft, and it is honeycombed with 28 steel dredging tubes of 18-ft dia.

While the cutting edge was being towed down the Mississippi, the pier site was prepared at New Orleans. First, a huge mattress of willow trees was sunk over the river bed to prevent scour. (explained later). Then, a U-shaped stall was built to enclose and guide the sinking of the caisson. It consisted of a steel frame supported on thirty-nine 36-in. steel pipe piles 150 ft long. The prefabricated frame was assembled on shore and hung from beams supported on barges. The complete assembly was towed to the pier site and anchored.

The long piles were driven next by a 50-ton revolving crane with a 175-ft aluminum boom. After a few piles pinned the frame in place, the barges were pulled out, and the crane completed driving. Piles went 60 ft into the river bed and later were filled with gravel. To guide the descent of the caisson, six double H-beam spuds were driven inside. The stall then was ready to receive the caisson.

When the 500-ton cutting edge reached New Orleans, it was moored against a working dock on the east side of the river. Here, it was extended vertically by a 27-ft high cofferdam. The exterior of the cofferdam consisted of 6-in. tongue and groove, caulked wood sheeting braced internally with four levels of heavy steel beams. The 28 dredging tubes were extended vertically.

With the cofferdam in place on top, the caisson was towed into the river and maneuvered into the stall. The open end of the stall was then closed and two more spuds driven inside for guides. The next step was to fill the gaps between spuds and caisson with timber rubbing strips. The lean of each spud was first determined so that the strips could be cut to provide a plumb face for the caisson to ride against. When properly cut, the strips were dropped over the spuds

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Rugged as the Rockies

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¼ Yd. 5 Ton	⅜ Yd. 8 Ton	½ Yd. 10 Ton	½ Yd. 12½ Ton

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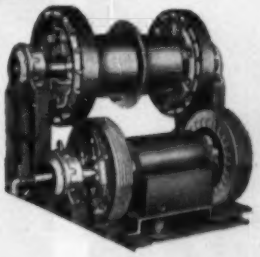
THE MOST COMPLETE LINE IN THE SMALL SHOVEL FIELD

with MORE Big Shovel FEATURES



MAIN ASSEMBLIES

Power up and down boom standard on all models.

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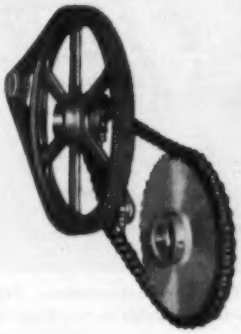
AIR COOLED DRUMS

Large size, louver-ventilated, ductile iron clutch and brake drums, finned-ventilated swing assembly drums . . . specially designed for cool, continuous running at top efficiency.



ALL CHAIN & SPROCKET DRIVE

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Smooth, positive minimum-effort control from new hydraulic system. New design control lever locks.

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Heavy, fully machined, hard steel rollers and roller path. Large, sturdy cast steel and electrically welded machinery frame. Perfectly balanced design assures minimum stress and absolute alignment to shafts, bearings and swing table gear.

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Daily grease fittings centrally located on cab panel. Intermittent grease fittings easily accessible. Positive grease and dirt seals at all revolving points. Force-feed, filtered, circulating lubrication on all chain and sprocket drives and on main shaft bearings. Main bearings also running in oil.

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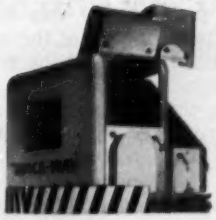
Self-aligning, anti-friction bearings on all high-speed, continuous, rotating shafts and drums. Special long-life, alloy bronze bearings on swing rollers and center rotating sleeve.

COMFORTABLE FULL VISION CAB

All operating controls, including instrument panel and lock throttle, conveniently located in front of operator. Safety glass windows on all sides and top insure full vision—sliding and hinged windows provide maximum ventilation.



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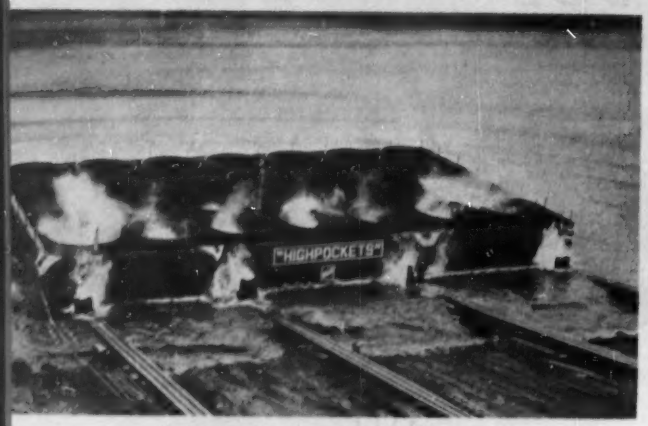
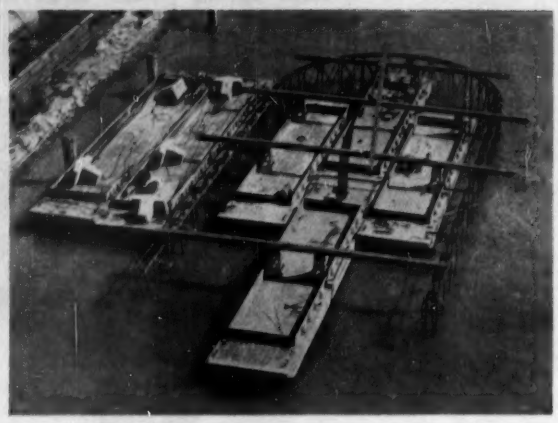
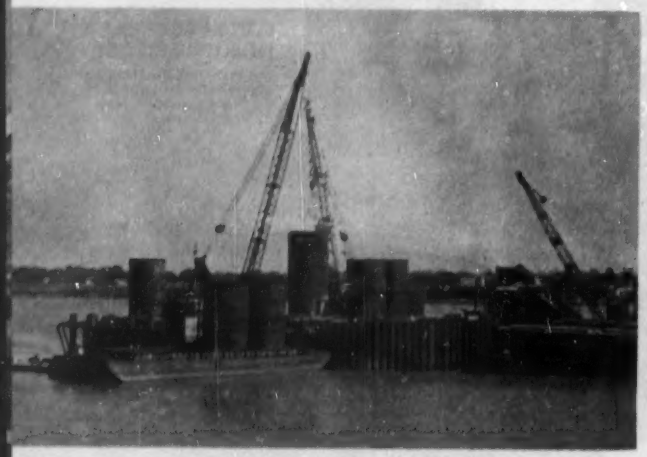
PIER II – Pipe-Pile Stall Encloses Floating Caisson



1. FLOATING cutting edge is launched on ways in Pittsburgh and prepared for 1,800-mi trip to New Orleans.



2. STEEL FRAME for caisson stall is hung from beams on barges. Assembly is towed out and pinned with piles.



5. DREDGE-WELL TUBES are extended for new cofferdam lift as caisson sinks into river. Later, sinking will get tougher.

6. PANEL of tongue and groove sheeting for outside of caisson is handled in yard by versatile Austin-Western crane.

MISSISSIPPI RIVER BRIDGE . . . continued

reducing the gap to only a few inches.

The caisson now was ready for sinking. Covers were placed over the dredge tubes, and concrete was placed inside the caisson. It was distributed to keep the big box level as it went down. When freeboard was reduced to about 20 ft, pouring stopped, and another 27-ft lift of cofferdam was placed on top. Generally, it takes about 10 days to add a lift. Bracing and tubes are set in about six days and sheeting in four. Panels of sheeting are set all around in about two days, but it takes another two to bolt them to the bracing.

This process of alternately pouring and extending cofferdams was continued until the caisson reached the willow mattress on the river bed. To puncture a hole through the mattress, a heavy 36-in. spud with a pointed end was dropped along the periphery of the caisson. The cut-out section of the mattress was then pulled up in pieces through the dredge tubes.

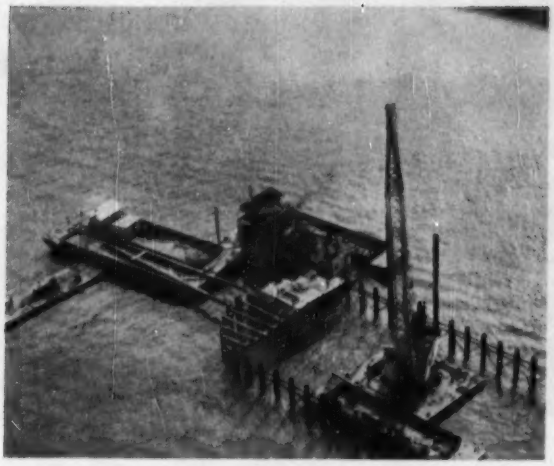
At present, the caisson has passed through the hole and is sinking through the river bed. On top, new lifts of cofferdam are added as needed. When five lifts have been built, a smaller cofferdam will be used to form the upper part of the caisson which steps back within the outer ring of dredge tubes. However, the outer ring will be extended to permit dredging of the entire base. Inside the stepped-in section, steel dredge tubes will be replaced with collapsible wood forms that can be used over again.

As the caisson sinks, underlying materials are dredged through the tubes with clamshells. The operation is closely supervised. If the caisson tips too much when sinking, it can be very difficult to replumb. Accurate records are kept of the amounts of material removed from each tube, and soundings are taken often through pipes embedded in the concrete.

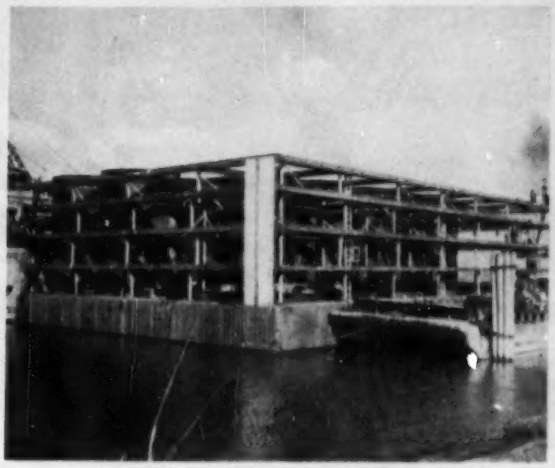
If stiff clay begins to hamper the sinking of the caisson, free jets, carried down through the dredge tubes, loosen material beneath the cutting edge. They will also clean out the bottom of the caisson when it reaches firm bottom.

Once the caisson is securely landed at elevation –180, the lower 20 ft will be sealed with 6,800 cu yd of tremie-placed concrete. The entire caisson will consist of about 35,000 cu yd.

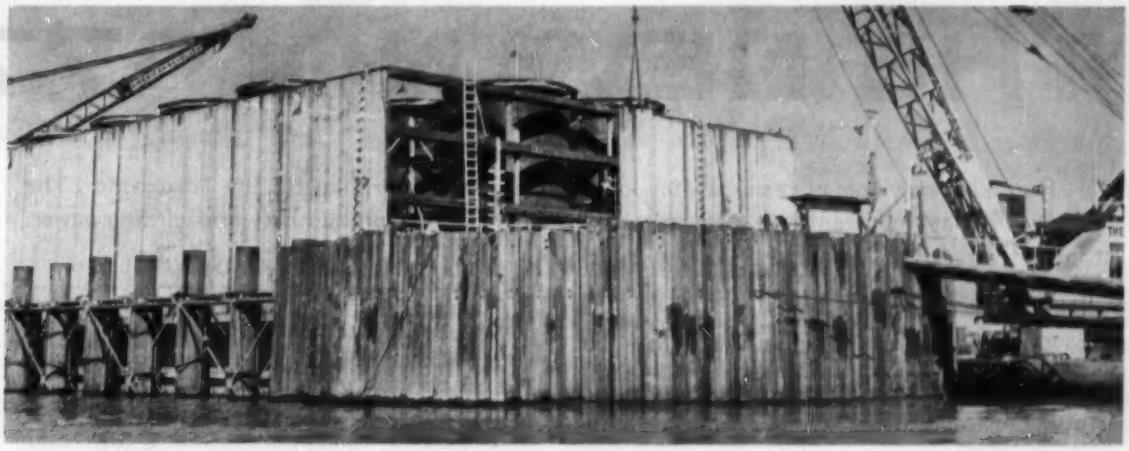
All concrete is batched and mixed in two floating plants, each capable of turning out 80 cu yd per hr. Each has automatic batching equipment and two 2-yd mix-



3. U-SHAPED STALL is made by driving 36-in. pipe piles 150 ft long. Crane has 175-ft aluminum boom.

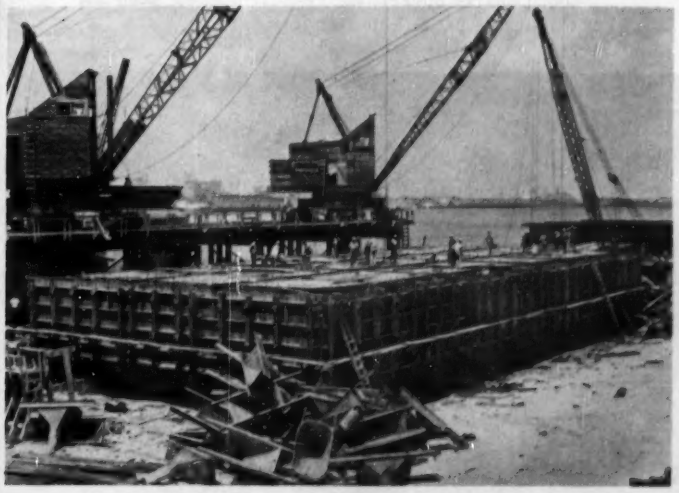


4. COFFERDAM BRACING for first lift is erected over floating cutting edge. Unit is towed to stall and enclosed.

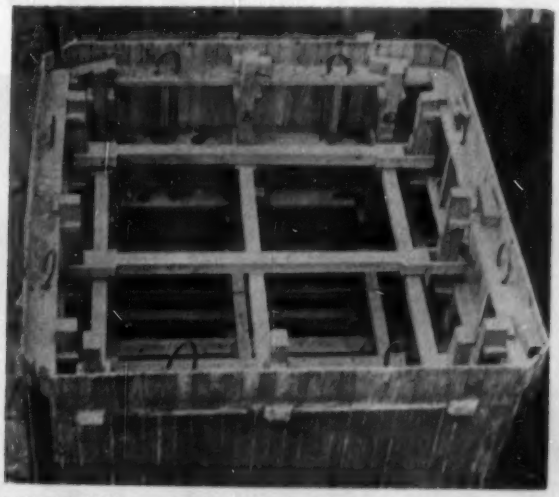


7. CRANE places panel of wood sheeting on caisson where it is bolted to interior bracing. Concrete is then poured around dredge tubes as caisson sinks. When big box reaches riverbed, muck is removed through dredge wells by clam-shells.

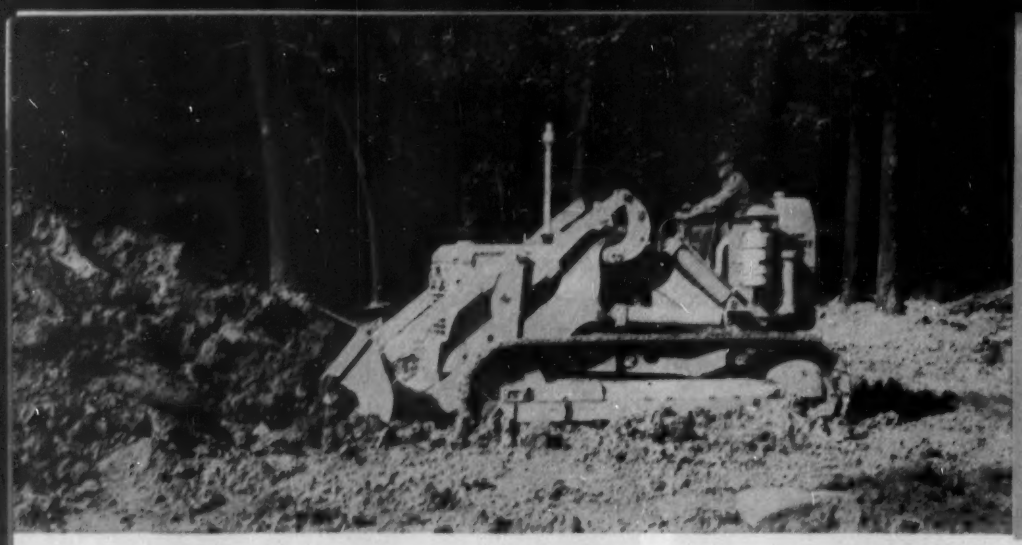
PIER III – Cranes Ride High and Dry on Trestle



LAND CAISSON near edge of river is sunk through partial sand island. Two 30-ton cranes ride on trestle above flood levels.



BOX FORM for square dredge wells collapses by removing wedges from free ends of internal braces. Plates slide over corner gaps.



1

Ample power and traction to "bury" the bucket.

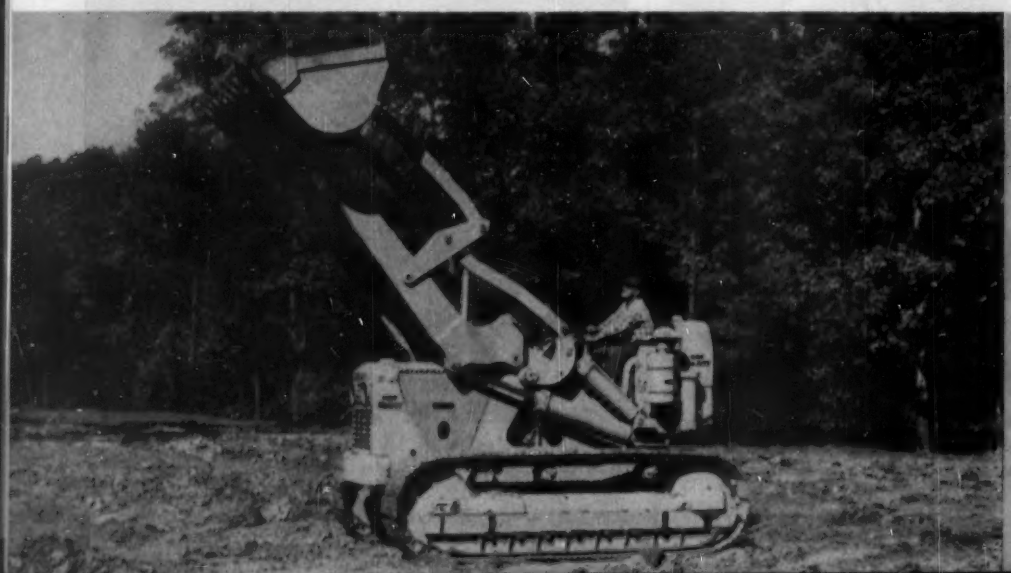
CATERPILLAR ANNOUNCES

THE NEW NO. 977

Here's the new boss of the excavator-loaders...the new Caterpillar No. 977 Traxcavator. The No. 977 has important new features which greatly increase productivity and earning power.

FEATURES OF THE NO. 977 TRAXCAVATOR

- 96-in., 2¼-cu.-yd. bucket.
- 100 HP CAT® Engine, with ample power to "bury" the bucket and lift big loads.
- Newly-designed bucket tips back 40° at ground level to retain heaping loads.
- More than 11½ ft. of dumping height make it easy to load any truck or railroad car.
- Steel bumpers on lift arms allow rapid jarring of bucket, and 50° discharge angle helps to empty sticky materials fast.
- Automatic kick-outs put bucket in "hold" position at maximum height and position bucket for digging on next pass. Easier operation and faster cycle times.
- Advanced hydraulic system, with pump protected by full flow filter.
- Hardened, spool-type operating valves located in large tank, protected from dirt or damage.
- Long-lived, trouble-free oil clutch.
- Fast, one-hand bucket operation. High seat for comfort and visibility.
- Five forward speeds to 7.4 MPH; four reverse speeds to 7 MPH.
- Each track controlled by heavy-duty dry multiple disc steering clutch and contracting band brake.
- Tools for any job: 3-yd. bucket for light material; 9-tooth quarry bucket; heavy-duty bucket; skeleton rock bucket; log and lumber fork.

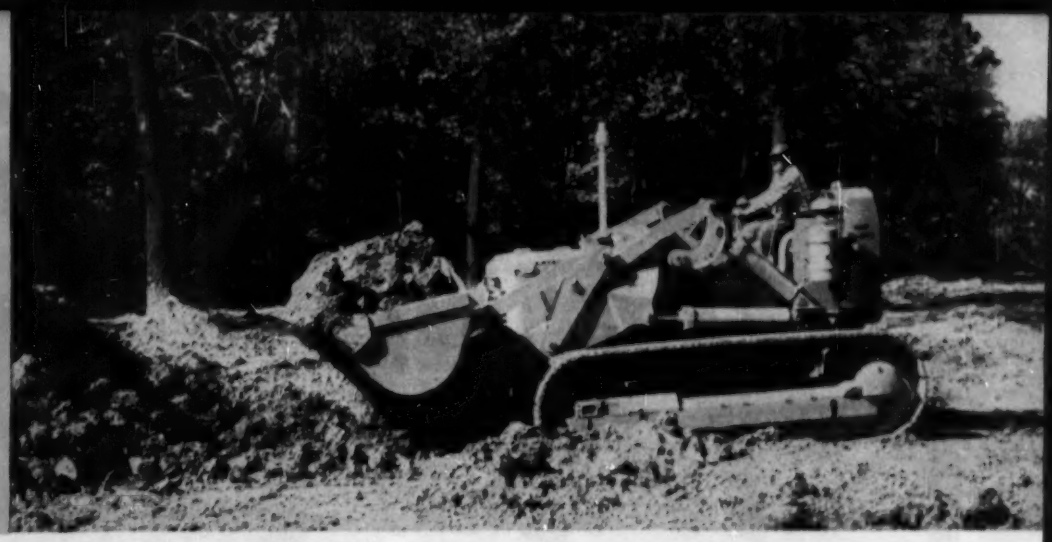


3

High lift, with over 11½ ft. of dumping height.

2

40° tip back at ground level to hold load.



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Now three sizes of Traxcavators are available for all your excavating and material-handling needs. They're *unit-built* machines, so efficient that you'll find they match or excel competitive equipment with nominally greater bucket sizes. You can choose the right Traxcavator for your job from the No. 933 (1 cu. yd.)—the No. 955 (1½ cu. yd.)—or the No. 977 (2¼ cu. yd.).

Let your Caterpillar Dealer show you how these new machines can make money and *save* money for you. Get complete information from him. Or mail the coupon.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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4

Fast, sure dumping of sticky materials.

4 PROVEN FELKER CONCRETE CUTTERS

for dependable concrete maintenance and repair

Felker Concrete Cutters combine all requirements for rugged service and fast cutting at lowest cost per foot! Built for low maintenance, and easy, dependable operation. Excellent maneuverability in all models with a complete range of sizes from low cost budget-priced machines to powerful heavy-duty machines for highway and airport applications. All models are equipped with exclusive Blade-Saver Collars insuring extra blade life. Hydraulic lift and retardant provide velvet smooth control on blade depth. Built by the *ONLY* manufacturer who makes both concrete cutting machines and diamond abrasive blades! Proved in use on major construction projects throughout the nation.

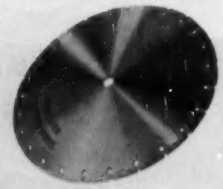
1 **FELKER MODEL 100**—A low priced concrete cutter for patchwork and light cutting. Light, exceptionally maneuverable. 7.5 hp Wisconsin drives 8" through 12" blades. Right or left hand operation with double end spindle.

2 **FELKER MODEL 200**—13.5 hp Wisconsin engine drives 10" through 14" blades. Equipped with power drive which removes physical effort, cuts more footage and extends blade life. Includes auxiliary coolant pump assembly.

3 **FELKER MODEL 254**—A heavy duty machine powered by a 25 hp Wisconsin engine. Perfect balance . . . tilts on front or rear wheels for quick maneuverability. Uses 14" diamond wheels or 18" wheels with special guard. Instant acting pump clutch saves wear, automatically shuts off water when pump is disengaged.

4 **FELKER MODEL 364**—Identical to the Model 254 but equipped with a 36 hp Wisconsin engine for extra heavy duty operation.

FELKER MASONRY SAWS—The masonry saw with the completely replaceable spindle quill. Gives new-saw performance with a 10 minute on-the-job replacement.



FELKER SEGMENTED TYPE DIAMOND BLADES—The preferred blade for all concrete sawing . . . fast, long-lived and available in a wide range of types for green or cured concrete. 6" to 24" diameters.

FELKER ABRASIVE WHEELS—Wet cutting, dry cutting and break resistant types for all masonry cut-off uses.

FELKER SPAN SAW—A multi-bladed concrete cutter for cutting control joints in large highway and airport slabs.

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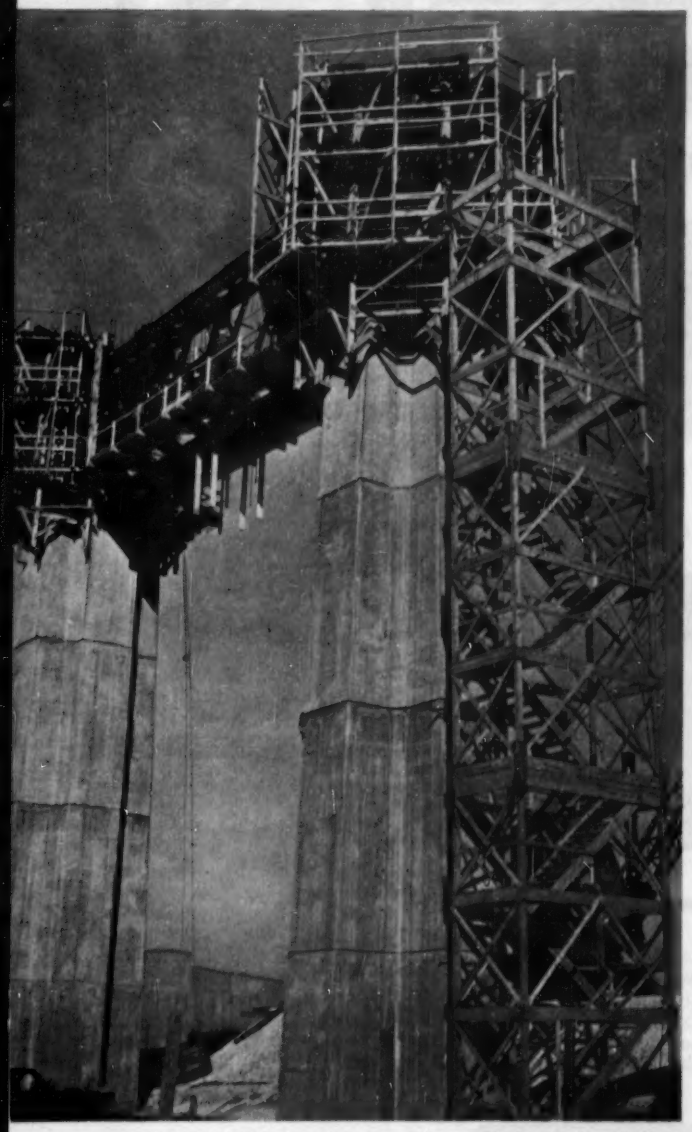
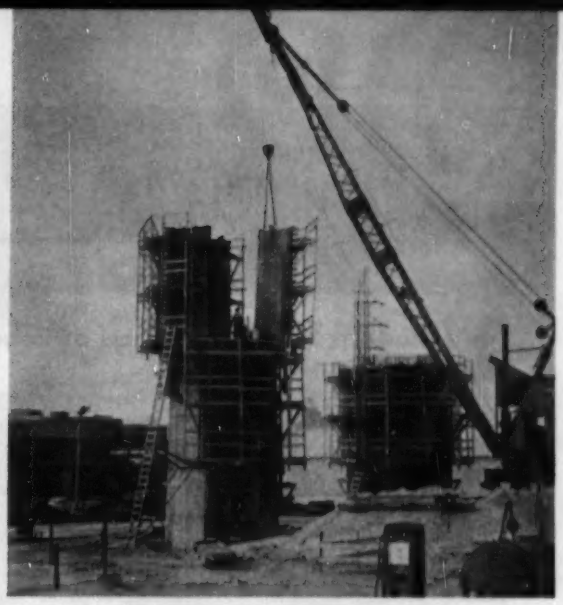
World's largest manufacturer of diamond abrasive cut-off wheels and equipment.

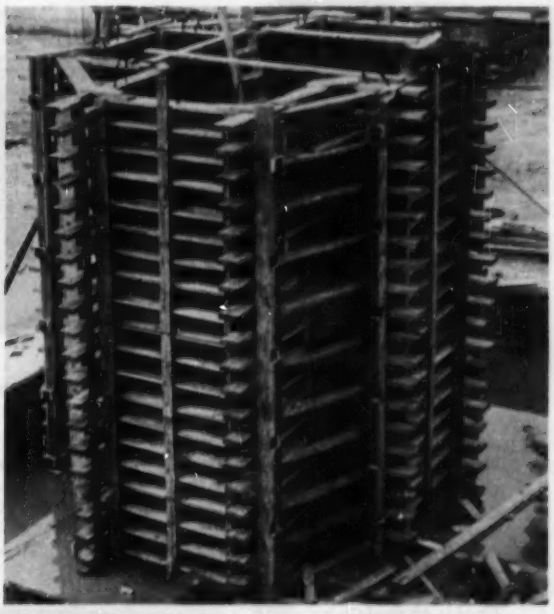
PIER I & IV – Safe Shaft Forms



TWIN-SHAFTS for Pier I are poured in sturdy form units with three levels of scaffolds permanently attached. Safe stairways are prefabricated in 30-ft sections.



CORNER-SECTION of shaft form is hoisted and then bolted to lower lift. Face panels are then moved up between corners and repositioned for batter. Form is broken up to cut weight.



CROSS-SHAPED form is assembled on footing before scaffolds are added. Form consists of ¾-in. plywood backed by 3x10 studs. Corners are tied into heavy 8-in. steel angles.

MISSISSIPPI RIVER BRIDGE... continued

ers. Buckets are handled by two 50-ton revolving cranes and emptied into elephant trunks hung between dredging tubes. Water that leaks through sheeting during pours is quickly pumped out.

On top of the caisson, a 10-ft thick distributing block will be poured in the dry inside a cofferdam. Shafts will rise above the block to elevation 161.5.

PIER III

A different set of problems faced the contractor on Pier III. Because the centerline of the caisson was right on the edge of the river, the big box was sunk as a land caisson. This required the building of a partial sand island at the river's edge. A row of arch-web steel sheet piling was driven around the area and filled in. On top, a steel cutting edge was assembled, complete with two transverse edges that divide a 4,200-yd tremie seal into three separate pours.

The caisson measures 62 x 136 ft, and has 21 dredge wells, each 14 ft 6 in. square. To speed sinking, the contractor assigned two cranes to the job. But they weren't ordinary cranes. Crawlers were ruled out because there is a good chance that the area around the pier will be flooded during the high water season. Besides, a crawler crane operator would be too low to see what he was working on.

Dravo solved the problem with a 150-ft long trestle mounting two

(Continued on page 00)

Announcing New Complete S-A

Modern Stā-Bilt Method of Road Stabilization

SEAMAN TRAV-L-PLANT and PULVI-MIXER build better road bases through faster, more thorough, accurately controlled in-place mixing — a normal production rate of up to A MILE A DAY of 22-foot road! Exclusive advantages include: Mixing for *all* types of stabilization including bituminous, soil-cement, gravel, or chloride, both sodium and calcium. Blending and properly placing aggregates and fines for more durable, higher loadbearing bases. Completely correcting aggregate segregation. Mixing, blending and finishing to final grade, partially pre-compacted ready for final rolling.

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Designed for highly accurate application of all binders, including water and bitumen, simultaneously with mixing operations. Equipped with pump, spray bar, tachometer assemblies, volumetric meter. All operating controls within quick easy reach. A perfect, *all-process* machine for economical mix-in-place operations. 7-foot mixing width, gasoline or Diesel powered.

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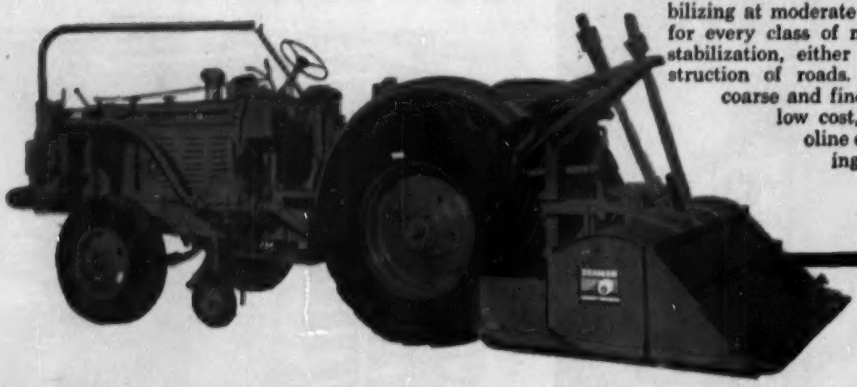
The stabilization "workhorse" for all types of stabilizing at moderate investment. Widely accepted for every class of mixing and processing of soil stabilization, either new construction or re-construction of roads. Delivers accurate blend of coarse and fine aggregate — for all-weather, low cost, long-wearing surfaces. Gasoline or Diesel powered. 7- foot mixing width.



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Revolutionary new design in heavy duty rubber tire rollers. Self-propelled for transport road speeds up to 20 m.p.h. Provides new "straight down" pressures . . . eliminates usual pushing action, surface shear, scuffing, material displacement. Power steering — full 180° turn on 20-foot road beds. Four 500-gal. Liquid Ballast Compartments — 5 Ton — 15 Ton — 20 Ton —

New SEAMAN-ANDWALL Portable and Self-Propelled Rollers and Compactors offer many new advantages in road building . . . Greater visibility and maneuverability, easier transport to the job, plus many new features that assure superior compaction, more accurate rolling — without surface sheer, scuffing, or material displacement. Choice of models for every type of operation, every contractor.

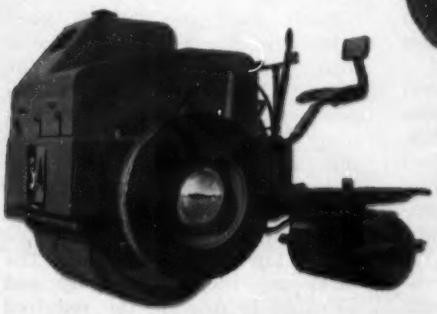
See your S-A Distributor —

Open the way to BETTER ROADS...at lower cost!

Stā-Bilt Line for Road Construction

SEAMAN-ANDWALL PORTABLE 7-10 TON TANDEM ROAD ROLLER

The first portable 10-ton Roller that is fully automatic, can be made portable in 90 seconds, and provides easy one-man operation. Equipped with 61 H.P. engine, fuel-saving TURBO-TORQUE drive. Hydraulically lowered trailing wheels are hinged and removable for rolling close to vertical obstruction.



SEAMAN-ANDWALL PORTABLE TANDEM 2-3 TON ROLLER

Highly maneuverable, compact, versatile, "one-man" Roller, designed for a wide variety of jobs. Gasoline powered, with compaction roll designed for liquid ballast. Hydraulically lowered pneumatic tired wheels for easy trailing and transport. Wheels removable for close-up rolling to avoid hand work.

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There's a SEAMAN-ANDWALL Spreader for every need, in models and sizes to fit every road-building budget. Each one has unique advantages and features to meet specific requirements — in all types of materials, in daily production, and in accuracy of volume and placement.

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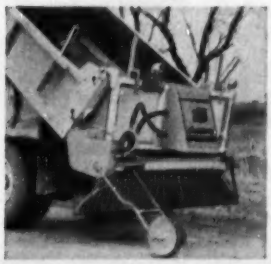
Heavy duty spreader for soil-cement paving. Auto-type differential provides efficient transfer of power, hand-lever controlled. Has strike-off bars for accurate quantity control up to 10-foot width. Dual Pneumatic tires for traction. Easy to attach, requires no special tail gate.



CENTURY CEMENT SPREADER

A new idea in spreader design, providing absolute accuracy in cement spreading. Positive volumetric control of cement governed by free-running tachometer wheel which cannot skid or slow down. One-man remote operation from truck cab.

CENTURY MATERIALS SPREADER

The SA Century "Posi-Feed" Model HY-4 . . . Demountable tray for seal coating can be replaced with spinner for spreading sand or chlorides. Vibratory mechanism in the truck body maintains steady movement of materials to avoid uneven distribution. Eliminates hand feeding from truck body. One man operation.

Write for Bulletin

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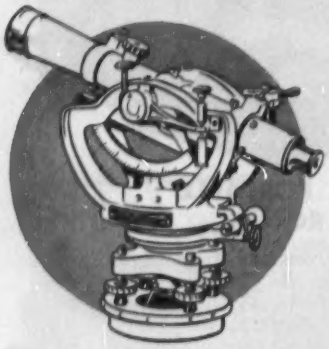

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30-ton revolving cranes. Supported on 32 steel piles 160 ft long, the trestle runs alongside the caisson just outside the partial sand island. During dredging, the electrically-powered cranes quickly hoist clamshells from the caisson wells, swing them around, and empty them in scows moored nearby. (When filled, scows are towed into the river and emptied in at least 50 ft of water.)

During a pour, two floating concrete plants are moved up to the trestle, one for each crane. Because of the trestle's height, it is simple for the crane operators to swing buckets over the caisson and place them over hoppers. They seldom have to operate through a series of signalmen.

Because Pier III is constructed in the dry, the forming problems are much different than on Pier II. The cutting edge, for instance, is a simple shoe instead of an elaborate water-tight floater. It was assembled on the sand island and supported on blocks to distribute the weight. When it was fully assembled, the supporting blocks were knocked out systematically to keep the cutting edge plumb as it sank.

Wood forms for the outside and also the dredge wells were then erected on top, and the first lift poured. With a land caisson of this type, there is no loss of forms like there is on a floating type. One set of forms is used over and over on top until the caisson is founded at elevation –165.

Quick form assembling and stripping is the key to fast sinking. Around the outside, panels faced with 2x6-in. tongue and groove sheeting are quickly bolted into inserts embedded near the top of the lower lift. Inside, the square dredge wells are formed with neat-looking, box-type units that collapse for stripping. To provide slack for collapsing, gaps are built into chamfered corners. To keep the gap covered, a steel plate is attached to only one side, allowing it to slide when the form is stripped. Clogging of the plates during a pour is prevented by covering the corners with paper.

Collapsing is done by simply removing a wedge at the free end of each horizontal internal brace. Small jacks break the panel from the concrete, and the entire box is lifted from the dredge well by a crane. Placing the box form is done by reversing this procedure. It's a fast operation. Blocks attached to the base of the sheeting fit into corresponding recesses near the top of the lower lift. They position the box accurately until it is braced securely. One set of forms builds the entire caisson.

PIERS I AND IV

Although foundations for Piers I and IV (under the anchor arms) are completely different, the shafts are identical. Their cross section is roughly a cross, which is a difficult shape to form. The inside face is plumb, the other three are battered, and the inside corners are chamfered.

Each shaft could have been formed with a single unit moved intact for each new lift. But the weight of such a huge form would have required a high-capacity crane. Instead, the contractor made the form in eight sections—four L-shaped corners and four faces. After each pour, the corners are moved up one at a time and bolted to the top of the lower lift. The faces are then hoisted up and adjusted to provide the required batter. The unit is about 22 ft high.

The corner sections carry most of the load. They consist of ¾-in. plywood backed by 3x10 horizontal studs and double vertical walers. At the corner, they are anchored to an 8-in. steel angle.

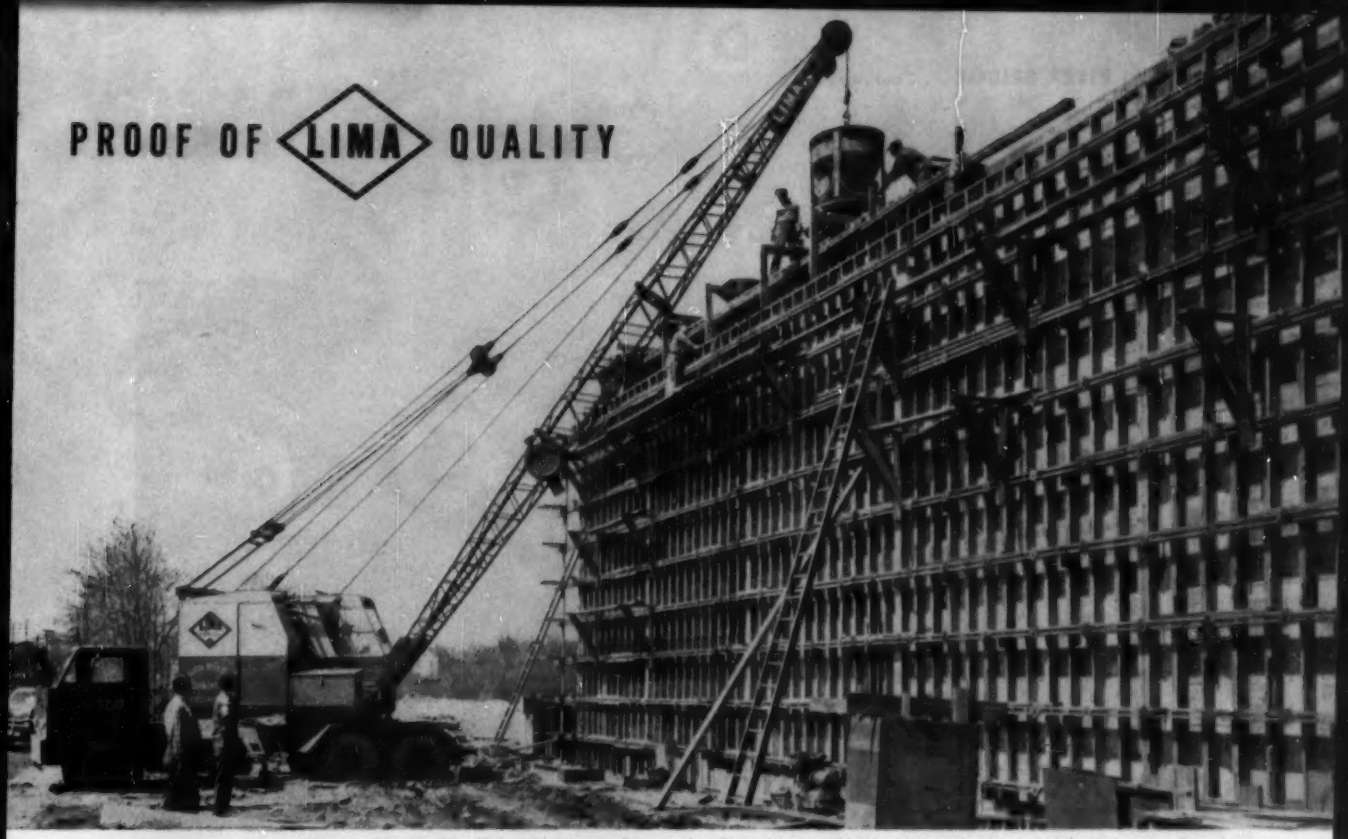
Because of good scheduling, the shaft forms on Pier I will be moved over to Pier IV as soon as it is ready. This gives the contractor 14 reuses from each unit.

Big problem with the huge willow mattress (page 82) was sinking it within an allowable tolerance of only 15 ft. More than 30 anchors were placed on the riverbed before the mat arrived, 16 for the upstream end. Mooring barges acted as a temporary frame. When anchored, the mat was loaded with stone ballast. Then, barges carrying hundreds of men were gradually pushed over the mat from upstream end to downstream end. Men threw on more stones, and the mat sank at an angle as it pulled on the upstream anchors. It landed as planned.

PERSONNEL

B. N. Parker is superintendent for Dravo Corp., and N. Sorgenfrei is resident engineer for Modjeski and Masters. C. Cassagne, Jr. is chief engineer of the Mississippi River Bridge Authority.

PROOF OF LIMA QUALITY



These 29 Limas at The Union Building & Construction Corp. illustrate Lima's ability to furnish a machine designed to fit every job requirement; 7 Type 34-T, 20 ton truck cranes; 1 Type 44-T, 25 ton truck crane; 2 Type 34, ¾ yd. crawler clamshells; 2 Type 44, 1 yd. crawler shovels; 3 Type 703, 1¼ yd. crane-dragline-pullshovel combinations; 1 Type 7035C special crane; 2 Type 802, 2 yd. crawler shovels; 3 Type 803, 2½ yd. shovels; 4 Type 1201, 3½ yd. shovel-crane combinations; 3 Type 1601, 4 yd. shovel-dragline combinations.

The Union Building & Construction Corp. . . .

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The 29 Limas operated by The Union Building & Construction Corp., Passaic, N. J., are clear evidence of their reliance on Lima quality. Year-after-year, they've added to their fleet of these quality-built machines. Why? Because each of their Limas continues to give them top performance and operating economy on every digging and lifting job . . . without frequent, costly maintenance. That's how Lima quality builds profits for Lima users.

Across the country and around the world, firms like The Union Building & Construction Corp. rely on Limas for profit-making performance. It will pay *you* to contact your nearby Lima distributor for complete details on these quality-built machines . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

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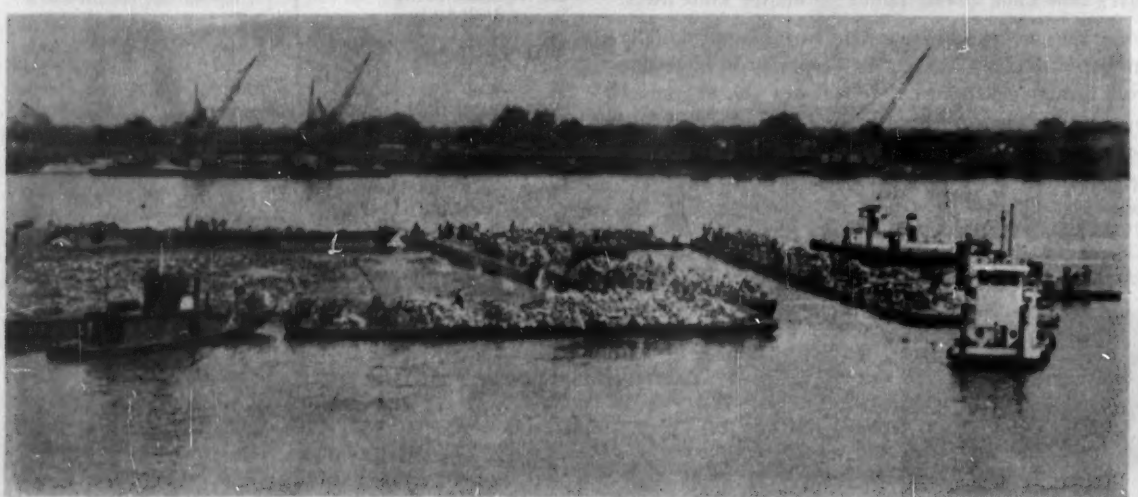
Willow Mattress Sunk to Riverbed

To prevent scour around Pier 11, engineers called for a 300x500-ft mattress of willow trees to be sunk to the riverbed. Dravo fabricated the massive mat upstream, towed it to the site, sank it, and then punctured a hole in it to allow the caisson to pass through. At the fabricating site (above) willow trees 4 to 6 in. in dia were woven into 16-in. logs. These logs were tied together on ways one at a time as the mat gradually moved into the water. After towing down the river, the mattress was anchored over the site and enclosed by barges loaded with stone ballast (right). Workmen distributed stone over the mattress until it almost reached the point of negative buoyancy. Then, loaded barges were moved over the upstream end, more rocks were thrown (below) and the huge mat sank to the bottom. It landed within a few feet of the desired point. Tolerance was only 15 ft.



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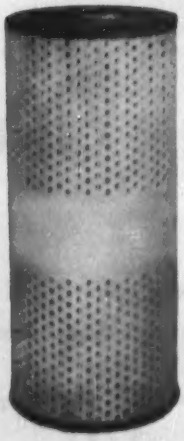
103 drawbar horsepower is feature of new International TD-18A Diesel crawler.

Is every filter refill "good enough" *for a heavy duty diesel like this?*



The answer is the same for any Diesel -- substitutes for manufacturer-approved filter refills are *not* "just as good." And for one simple reason: filters that "will fit" in a full-flow system can't always handle the volume they get on the job. Oil still reaches the engine, of course – the by-pass valve takes care of that. But it's dangerous unfiltered oil that pours into your Diesel. Laden with abrasive, this oil can wear a bearing seriously in a matter of hours.

That's why your International Harvester dealer-distributor gives you only manufacturer-approved replacement filters. They are made by PurOlator to International Harvester's own exacting engineering standards.

For the same reason, your Diesel deserves only manufacturer-approved oil filter refills too. Its engine life depends on it.

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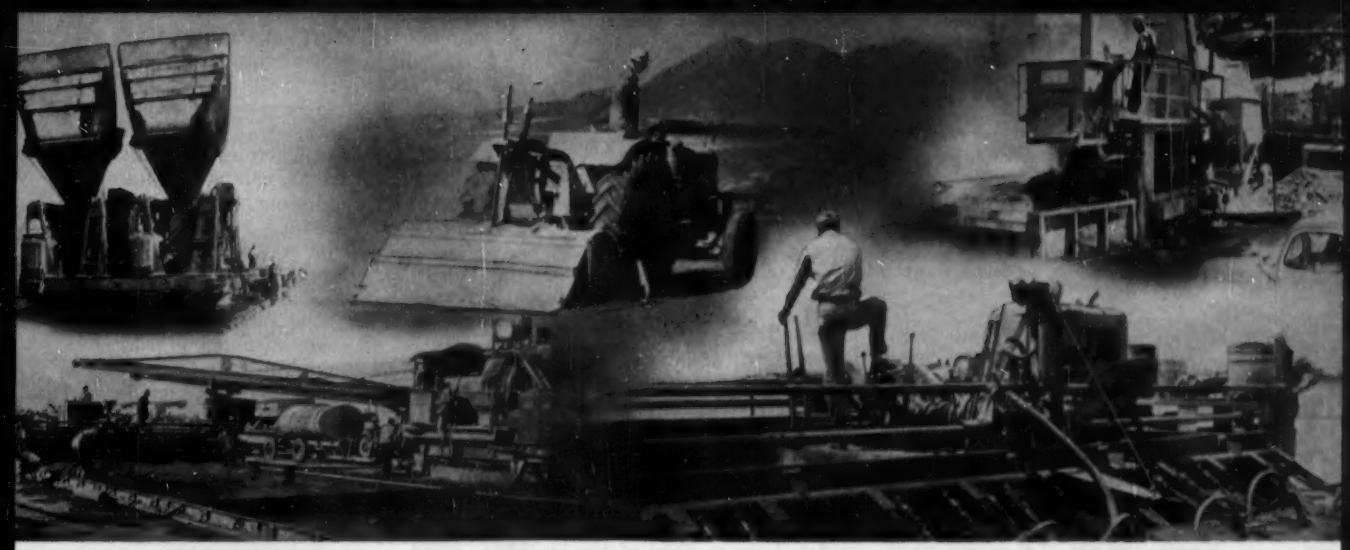
PAVING...How to Get the Best Results



5. Plant-Mix Bituminous Pavements

Part II

By BERNARD E. GRAY
Former President, The Asphalt Institute

DESIGN of plant-mix bituminous pavement material is of great importance to the contractor. Specifications set outside limits for gradation of aggregates and percentage of asphalt, but they allow the contractor considerable leeway to select the materials to be used.

Within the limits set by the specifications, there can be a number of possible combinations, any one of which would be satisfactory. Choice of a particular combination usually depends upon the aggregates available. Some aggregates cost more than others; some require more work to handle, dry, and screen. Sometimes a large part of the filler may be in the dried aggregates; at other times the contractor may have to add almost the entire amount of 200-mesh material separately.

Filler and asphalt usually are the most expensive items in the mix. Appropriate study will enable the contractor to choose the combination of all constituents with the lowest manufacturing cost and with all the needed qualities for stability, flexibility, and durability.

Several methods for testing trial mixtures in the laboratory and determining their properties are available. The test procedures in most common use include the Marshall, the Hveem, and the Hubbard-Field. All three accurately evaluate the stability characteristics of any combinaton of aggregate and asphalt.

Hubbard-Field equipment was the earliest. It was designed originally for sheet-asphalt mixtures but adapted later for testing coarse aggregate mixtures. Hveem testing equipment was introduced in California particularly for testing graded aggregate asphaltic concrete mixtures, but it can be used for any common plant mix. The Marshall machine is the newest. It was widely used for military work during World War II. It is light in weight, readily portable, and simple.

Any contractor with a large volume of plant-mix operations should own the test equipment which is standard with the contracting agency for whom he works. This equipment will not only enable him to comply with specifications but will give him a means for searching out the most economical combination of asphalt and aggregates to meet the specifications.

A contractor must work out two formulas for any given project. One is the preliminary job-mix formula, based on a laboratory study of the aggregates available. The other is the plant-mix formula. That is the job-mix design applied to the aggregates as they arrive in the bins after drying and screening.

Here is an example to show the steps involved. The graded-aggregate type of hot-mix, hot-laid asphaltic concrete is selected because it is typical. Table I (see p. 86) shows a frequent specification grading range for combined aggregates compared with three commercial gradings of aggregates available. With these aggregates, the permissible range of asphalt is from 5% to 7%—or higher for very absorbent aggregates.

First you choose the average gradation from the specification for comparison because the trial mix then will indicate which way to go in subsequent adjustment. You begin with the finest size and calculate back to the coarsest.

Practically all of the amount passing the No. 200 sieve obviously must come from aggregate No. 3.

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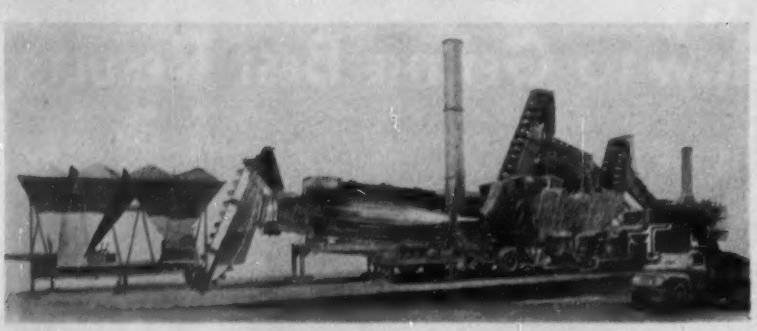

FLOW DIAGRAM through a Barber-Greene continuous-mix central plant shows the movement of aggregate from the cold bins until it is discharged into a truck as finished mix.

Assume that 2% will come from the other two aggregates. That leaves 5% of the 7% average called for by the specifications to be obtained from aggregate No. 3. Now, 88% of aggregate No. 3 passes the No. 200 sieve, so 5 divided by 88 or 6% is the estimated proportion of aggregate No. 3 to be used.

You select No. 10 as the next control sieve. Aggregate No. 2 practically all passes it. But you must note that aggregate No. 1 contains 8% passing the No. 10 sieve and make a corresponding allowance. Estimate that aggregate No. 1 will constitute about 50% of the combined mix. (This need not be an accurate estimate because only 8% of the total is involved). Then, multiply 8 by 0.50 and you will get 4% as the amount of No. 10 material to be allowed for from aggregate No. 1.

The specification average passing sieve No. 10 is 36%. You have estimated that you will get 6% from aggregate No. 3 and 4% from aggregate No. 1. That leaves 26% to come from aggregate No. 2. Because 93% of aggregate No. 2 passes the No. 10, you divide 26 by 93 and get 28%, the estimated proportion of aggregate No. 2 to be used.

The proportion of No. 1 aggregate then is simply 100 minus 34 (6 plus 28) or 66%. Table II shows in detail the method of combining these aggregates.

This example is rigged to come out closely enough for acceptance on the first trial. In actual practice, this seldom happens. But a study of the influence of individual aggregates on the composite gradation, or examination of the plotted gradation curves, will indicate what corrections you will have to make.

Of course, it may happen that no acceptable combination of three particular aggregates will work out. In that case, you must try other aggregates or add small amounts of a fourth aggregate to make up for lack of a particular size.

Table I

Percentage Passing

Sieve size	Specification Range Min.	Max.	Ave.	Aggregate No. 1 (Coarse)	Aggregate No. 2 (Fine)	Aggregate No. 3 (Filler)
1 in.	95	100	98	100	—	—
½ in.	70	85	77	63	—	—
No. 4	40	55	47	19	100	—
No. 10	30	42	36	8	93	—
No. 40	20	30	25	5	55	100
No. 80	12	22	17	3	36	97
No. 200	5	10	7	2	3	88

Table II

Sieve Size	Agg. No. 1 Total Passing	(a) x66%	Agg. No. 2 Total Passing	(b) x28%	Agg. No. 3 Total Passing	(c) x6%	Combined Grading (a+b+c)	Specification Average
1 in.	100	66.0	100	28.0	100	6.0	100	98
½ in.	63	41.6	100	28.0	100	6.0	75.6	77
No. 4	19	12.5	100	28.0	100	6.0	46.5	47
No. 10	8	5.3	93	26.0	100	6.0	37.3	36
No. 40	5	3.3	55	15.4	100	6.0	24.7	25
No. 80	3	2.0	36	10.1	97	5.8	17.9	17
No. 200	2	1.3	3	0.8	88	5.3	7.4	7

How Much Asphalt?

When you have a good trial combination of aggregates, the next step is to determine the amount of asphalt to add so that the combination will have the required stability and density. Both stability and density can be determined by standard laboratory procedures. But keep these principles in mind:

- When thoroughly compacted, the mixture should develop not less than the minimum stability value specified so that it will not shove or rut under traffic. But excessively high stability is not desirable; it may make the pavement susceptible to crack development at low service temperatures.
- When thoroughly compacted, the mixture should contain not more than 5% nor less than 3% voids. The maximum assures impermeability; the minimum prevents overfilling of voids when the pavement reaches high service temperatures. Overfilling of voids may result in bleeding and loss of stability under traffic and in summer heat.
- The mixture should contain as high a percentage of asphalt as is consistent with the first two requirements. This will give the pavement maximum durability and prevent ravelling because of a deficiency of asphalt.
- The mixture should be readily workable when heated to the temperature specified for spreading. This facilitates uniform spreading and compacting.

A little experience will enable a laboratory man to determine whether a mix is too harsh, stiff, or gummy. Lowering the percentage of coarse aggregate (that retained on the No. 10 sieve) often will reduce harshness. To reduce stiffness, lower the percentage of sand and filler. Reducing the percentage of asphalt and filler, particularly with very fine graded mixes, will eliminate gumminess.

If the first trial mix does not measure up to the standards required, you must adjust the formula and experiment until you find the right combination. Here are some guides that will prove useful in adjusting the mix:

I. When stability is satisfactory, but density is unsatisfactory.

A. Voids less than 3%.

1. Reduce the percentage of filler or of asphalt, or both.
2. Change the proportions of coarse and fine aggregates.

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SOLD *but not forgotten*

by your Allis-Chalmers dealer

When you invest in Allis-Chalmers construction equipment, you are getting far more than just a modern machine. Your dealer offers you the opportunity to do a better job at lower cost. He wants your equipment to give A-1 performance day in and day out. His reputation depends on it.

That's why your Allis-Chalmers dealer puts so much importance on good preventive maintenance practices . . . encourages you to take full advantage of his modern servicing facilities.

You're always sure of

TRUE ORIGINAL PARTS

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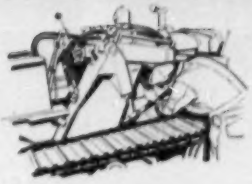
Parts made in the same factory, to the same rigid specifications as original equipment, are your assurance of getting top performance and long life. Treated, packaged and sealed against rust and dust, True Original Parts are stocked in quantity by each dealer to give you quick service close to your job.

And you can have confidence in his

FACTORY-TRAINED MECHANICS, FACTORY-APPROVED METHODS

IN THE SHOP

Specialized facilities include factory-approved tools and all necessary equipment for complete service. Factory-approved methods are used to save you time and money, assure finest workmanship.



IN THE FIELD

Factory-trained servicemen are ready to help you, day or night. Their technical know-how and practical experience get the job finished fast . . . at lowest possible cost to you.

You can depend on your Allis-Chalmers dealer

CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

TRENCHING 8 MILES through hard shale at Little Rock Air Force Base at Jacksonville, Arkansas, the powerful American Backhoe turned out steady production without costly maintenance delays. "Our American chewed through that hard shale day in and day out without a single hour of downtime," Bruce Bird, Project Engineer, says. After trenching, concrete storm drain pipes from 12 to 96-inch diameters were placed atop 20 inches of tamped backfill.

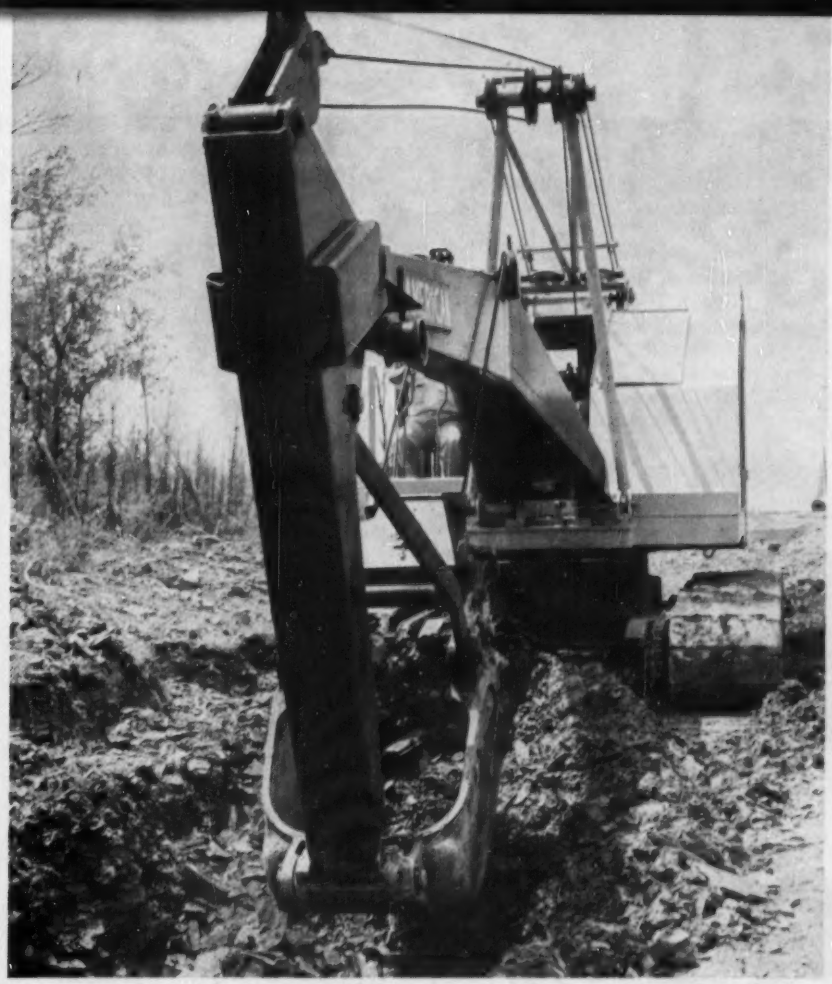
AMERICAN DIGS THROUGH HARD SHALE WITH "NO DOWNTIME"

"Our two American 300 Series Backhoes have been real producers even in the eight miles of hard shale encountered at the Little Rock Air Force Base Project," says Bruce Bird, Project Engineer for T. F. Scholes, Inc. "With American's dipper pitch bar arrangement, we adjust the dipper pitch for best results in any type soil," Bruce says. "This way, the operator gets faster digging action and makes more swing-dump cycles per hour without spillage—the kind of production you have to have to make money."

One of the country's leading contractors, T. F. Scholes, Inc., has found that American's rugged design, trouble-free travel assembly and fine engineering not only reduce maintenance costs, but result in dependable, low-cost production.

"FASTEST PRODUCING BACKHOE we've had on any job," says Project Engineer Bird. "The American's controls are right where they belong for fast, easy handling, and, with anti-friction bearings in the brake linkage, our operators turn out a big day's work without being tired."

(Advertisement)



RUGGED DESIGN of the American's boom and dipper stick is shown in a close-up at left. Of box-type construction, it has great strength with relatively light weight. The photo also shows clearly how the exclusive dipper pitch bar arrangement makes it possible to tuck the dipper up at an angle to keep the load from spilling. It's another of the advanced, time-saving engineering features that makes American the top-producing Crawler Crane in the field.

LOW OPERATING COST and high production records make the new American 100 Series Crane industry's top dollar buy in the ½-yard class. Shown with a shovel front, this versatile, highly-maneuverable crane can be quickly converted for clamshell work, as a lifting crane or backhoe. American's 78 years of experience making the world's biggest and most rugged lifting equipment is clearly evident in this new money-maker. Every pound, every inch of space, is utilized for top production. Everything is easy to get at for routine maintenance.

SAFELY, SWIFTLY, EASILY, a 108-inch concrete pipe section weighing 16,650 pounds is lowered into place by an American 300 Series Truck Crane. The American's power-controlled boom lowering combined safety with speed and enabled the contractors to lower the 8-ton pipe sections with pinpoint accuracy.

WORLD'S RECORDS fall regularly to products of American Hoist. Recently, in the Gulf of Mexico, a new American Derrick, specially designed for off shore oil operations, made a new world-record lift of 800-tons. The lift was nearly twice the previous estimated record made by the block and fall method. The same engineering experience —over three-quarters of a century—that makes such feats possible, is seen in American's extensive line of Crawler and Truck Cranes. Day after day, on jobs across the country, American Cranes are proving their superiority —giving outstanding performance at low operating cost. For factual details on American Crawler and Truck Cranes, contact your local American Distributor, or write American Hoist and Derrick Co., St. Paul 1, Minn.

AMERICAN HOIST

and Derrick Company

Saint Paul 1, Minnesota

B. Voids greater than 5%.
1. Increase the percentage of filler or asphalt, or both. Porous aggregates require the maximum specified percentage of asphalt.
2. Change the proportions of coarse and fine aggregates.

II. When stability is too low.

A. Voids less than 3%.
1. Increase the percentage of filler or reduce the percentage of asphalt, or both.
2. Increase the percentage or the angularity of coarse aggregate.

B. Voids greater than 5%.
1. Increase the percentage of filler or the asphalt content, or both.
2. Change the proportions of coarse and fine aggregates.

C. Voids between 3% and 5%.
1. If the percentage of asphalt is near the high limit, try increasing the percentage of coarse aggregate and reducing the percentage of asphalt.
2. If the percentage of asphalt is near the low limit, it is probable that the mineral aggregate is inherently unstable. In this case it may be necessary to obtain coarse or fine aggregate from some other source. If the coarse aggregate is broken stone, the trouble usually will lie with the fine aggregate. If the coarse aggregate is gravel, it may be responsible for the low stability. Before rejecting any aggregate, you should prepare and test trial mixtures using both the maximum and minimum percentages of coarse aggregate permitted by the specifications.

III. Where stability is too high.

High stability may be very desirable if it results from the interlocking of angular pieces of aggregate, particularly the coarser sizes. This type of stability usually can be identified by redesigning the mixture so as to use a minimum of fine aggregate and a slightly higher percentage of asphalt than specified for the particular mix. The redesigned mixture may not be satisfactory from the standpoint of density, but, if its stability still is high, the apparently excessive stability of the original design is desirable.

High stability is undesirable if it is due to excessively high density and low voidage of the compacted mineral aggregate. A pavement of this type would be brittle in cold weather and would have relatively low resistance to cracking and ravelling. Mixtures of this type usually have an excess of mineral filler and a deficiency of asphalt. Proper correction consists of decreasing the density of the compacted aggregate so that the maximum percentage of asphalt may be used without overfilling voids. This is simply a matter of using less fine aggregate and mineral filler.

Paving Plant Formula

To provide a simple example of a plant formula, let's assume that the gradation of aggregate shown in Table II is satisfactory, when combined with 6.5% asphalt, and will produce the required density and stability for the particular service conditions. Your plant is a 4,000-lb batch type mixer. Table

MEN OF STEEL

The story behind the brilliant construction achievements of the great TERRY organization is basically the story of men. Men of proven ability. Men of vast experience. Above all, *dedicated men* who have made it their business to master every facet of engineering, designing, fabricating and erecting. In every sense of the word, *men of steel.*

The entire structural steel work for the rebuilding of the Brooklyn Bridge was executed by TERRY.

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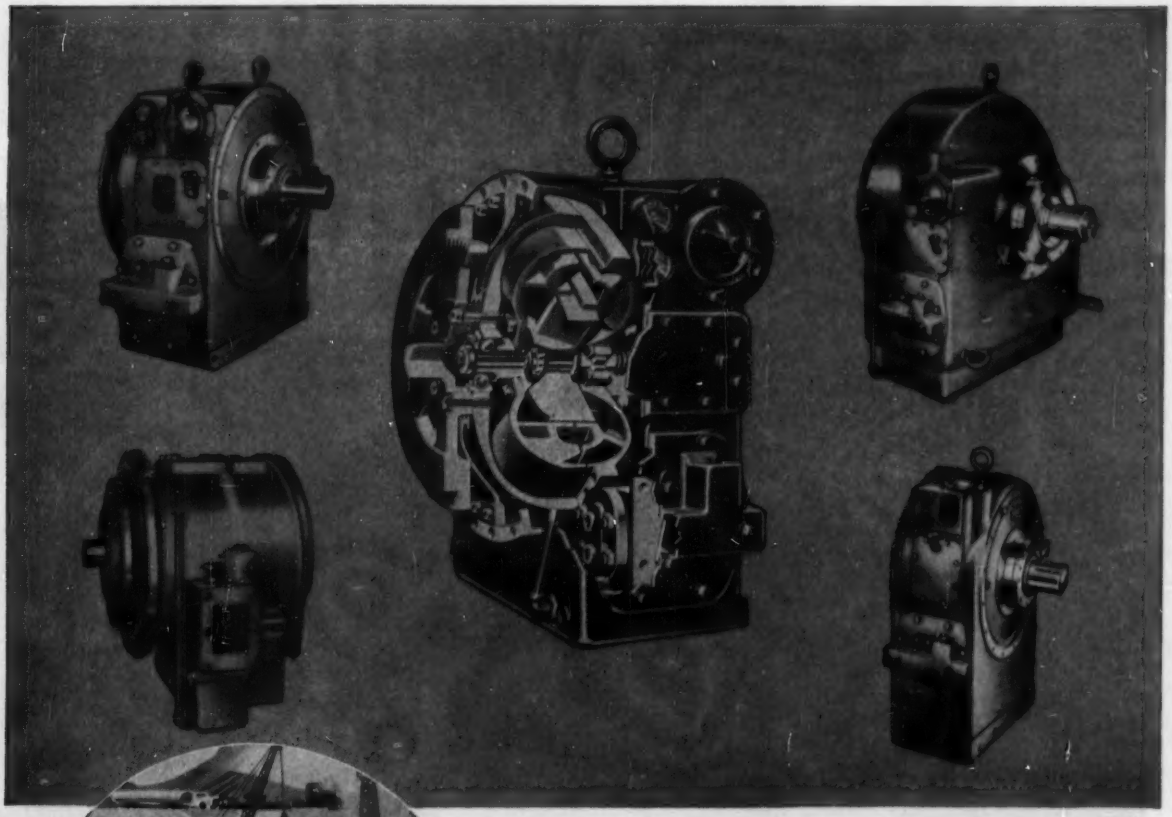

For your power need, *whatever it is,* there's a "right" TORCON Model

With a horsepower range from 15 to 600, and fly-wheel diameters from 11 to 26 inches, Torcon has a model that's right for your need — a standard unit available immediately for original equipment or for field installation.

Your real benefits begin after Torcon is installed—

- **more work and less wear: Torcon blade design balances engine efficiency and horsepower through the working range—smooth, shockless power that reduces wear, prolongs life**
- **integral unit includes oil pump, sump, pressure regulator; much better efficiency with minimum maintenance**

Are you constantly on the look-out for ways to get more efficient power at less cost? Talk to Clark—on all problems of power transmission, from flywheel to point of torque application. You'll find, as do many leading equipment manufacturers, that it's "good business to do business with Clark".

SEND FOR THIS TORCON BULLETIN

—a concise, helpful statement on how Torcon installations cut operating costs, prolong equipment life.

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DEMPSTER DIGGSTER GRD-101

....only front end loader or small shovel of its type with bottom dumping bucket!

HERE IS A SMALL SHOVEL and front end loader that is fully operated by hydraulic power with independent crowd and hoist action—an excavator and loader that needs no wheel traction. It is the only shovel of its type featuring bottom dumping bucket—emptied completely and instantly!

Hydraulic crowd and hoist moves bucket out-and-up to follow contour of material—getting a full load with every stroke. This reduces both loading time and idle truck time to a minimum. Thus, gets the job done faster!

The Dempster-Diggster is the only small shovel that offers you all the important features of big shovels . . . Simultaneous and Independent Crowd and Hoist . . . Hydraulic Crowding . . . Hydraulic Hoisting . . . Variable Crowd Action at any Dipper Position in addition to Changeable Bottom Dumping Buckets for digging or loading. Write for complete facts on this revolutionary, power-packed hydraulic shovel. A product of Dempster Brothers, Inc.

Above Dempster-Diggster GRD-101 is equipped with 1½ cu. yd. loading bucket for materials-handling. Photo below shows Dempster-Diggster GRD-101 excavating with 1 cu. yd. bucket with four teeth.

DEMPSTER BROTHERS 316 SHEA BLDG., KNOXVILLE 17, TENN.

PLANT-MIX PAVEMENTS . . .

continued from page 90

III shows the hot aggregates as they are screened into bins No. 1 and No. 2. Filler is not heated, but fed cold into bin No. 3.

Table 3

Percentage Passing

Sieve Size	Bin No. 1	Bin No. 2	Bin No. 3
1 in.	100	—	—
½ in.	61	—	—
No. 4	7	100	—
No. 10	3	82	—
No. 40	1	48	100
No. 80	—	34	97
No. 200	—	7	88

Now you need to know how much of the aggregate to weigh from each bin into each batch to produce a mix of the required grading. Because plant screening has divided the aggregates into sizes above and below the No. 4 sieve, the first step is to determine the percentage you should take from bin No. 1. (material coarser than No. 4).

The approved mix calls for 46.5% passing the No. 4 sieve (Table II) and 53.5% retained on that sieve. In screening operations it is inevitable that small amounts of material below the No. 4 size will drop into the coarse aggregate bin. Table III shows that Bin No. 1 has 7% of material smaller than No. 4 and so contains only 93% of material larger than No. 4. To get the full 53.5% of material larger than No. 4 in the mix, divide 53.5 by 0.93. You will get 57.5 and that is the percentage of the total aggregate you must take from bin No. 1.

Next you should compute the amount of material you will take from bin No. 3. You need 7.4% of material passing the No. 200 sieve. A part of that will come from bin No. 2 which contains 7% of material passing the No. 200 sieve (Table III). You can determine approximately what portion of the needed 7.4% of fine material will come from bin No. 2 by multiplying 46.5 (the percentage of the total passing No. 4 sieve) by 7 (the percentage of No. 200 sieve material in bin No. 2). This indicates that you will get about 3% of the necessary 7.4% fine material from bin No. 2 and will need to take 4.4% from bin No. 3.

Because only 88% of the material in bin No. 3 passes the No. 200 sieve, the actual amount you should take is 4.4 divided by 0.88

(Continued on page 96)

Shooting Trouble —before it starts!

The hooded figure above is shooting abrasive steel shot under terrific pressure — to remove every spec of dirt and scale from the welded steel frame of a LaCrosse trailer. As a result, the asphalt-base paint sticks better, protects longer against weakening corrosion.

This expensive shot-blasting process is just one of many special *quality-control* measures, which are used to build *extra* value and performance into LaCrosse low-bed trailers. For example, LaCrosse is one of the few trailer manufacturers we know that uses automatic frame positioners, to insure *uniformly perfect welds*, by 100% "down-welding".

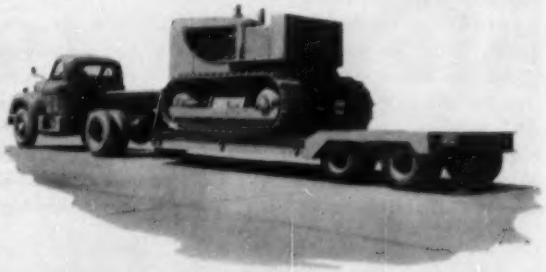
LaCrosse also builds and heat-treats its own axles, to provide better control of design and workmanship. Lengthwise LaCrosse oak decking is recessed for *minimum loading height*, and is securely levelled with Sealtite bolts, for extra strength and durability. In addition, each trailer platform is treated with special wood preservative, for extra long service life. Cast steel wheels save dead-weight, simplify tire alignment.

Remember, too, LaCrosse gives you *52 sq. in. more braking surface* than any other 4-wheel trailer — PLUS patented frame design which enables you to carry up to *1-ton more legal payload*. Choice of 80 different models — from 6 to 75-ton capacity — with flat, drop or tilting platforms. Write for details. LaCrosse Trailer Corp., LaCrosse, Wis.

LC-37

24-ton capacity

LaCrosse DF6T tandem axle trailer, with 8' drop platform, has loading height of only 26". It weighs approx. 9000 lbs. equipped with (8) 8.25x15" tires.



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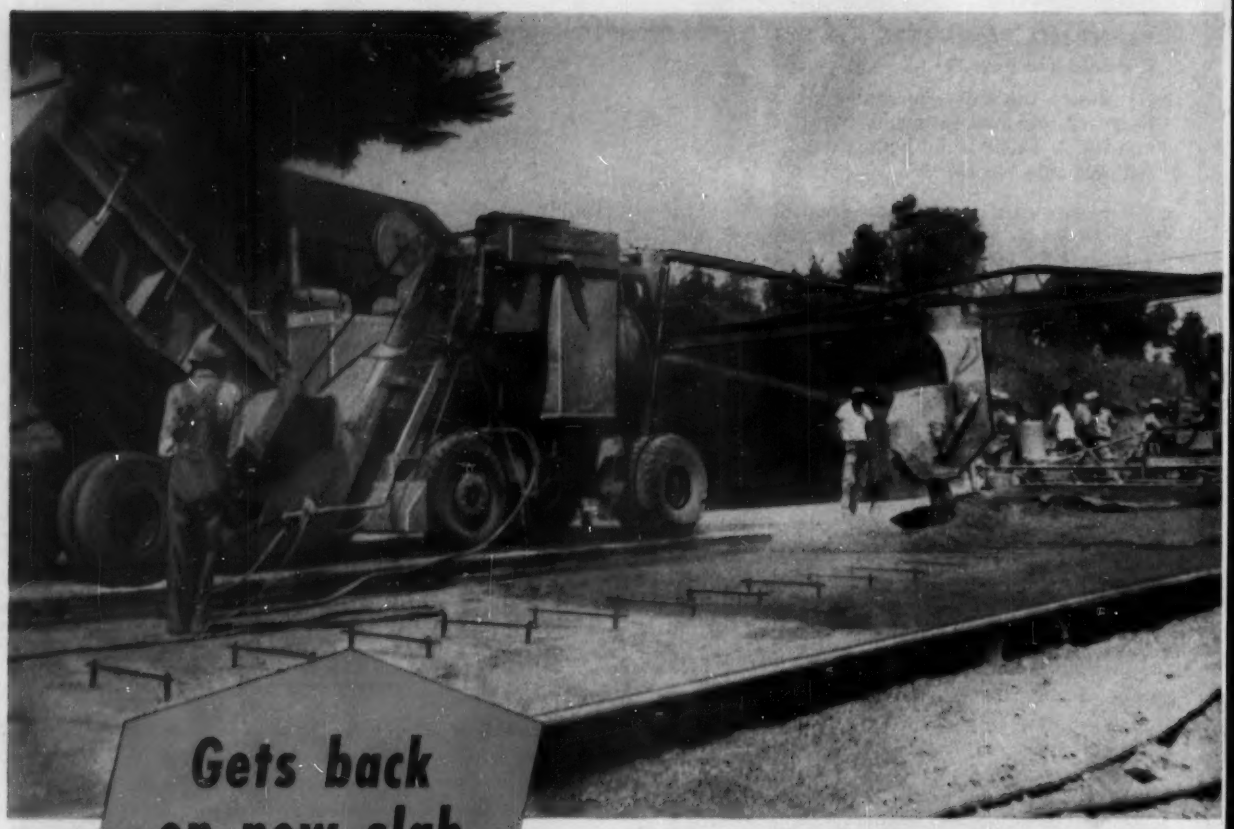


Gets back on new slab sooner — speeds paving schedules

KOEHRING 16-E *twinbatch*® paver on rubber tires is as mobile as your batch trucks. It works on or off-pavement — can get back on new slab in as little as 7 days to pave adjoining highway strips, scattered intersections, approaches to driveways and side roads. This time-saving "run-about" makes self-powered moves at 9 m.p.h. Yet, for all its mobility, the Koehring 16-E *twinbatch* is primarily a production paver — exceeds the output of large single-drum pavers on main highway work. For instance —

On straight-production paving, the Koehring 16-E hits a top output of 86.7 batches an hour (based on 60-second mixing cycle). This *reserve* production capacity with *twinbatch* Autocycle mixing offsets normal job delays — lets you pick up lost time which cannot be made up with a limited production single-drum paver.

Averages 50 cu. yds. an hour

As a result, the Koehring 16-E *twinbatch* easily maintains an average of over 76 batches an hour — 8 hours a day. Based on 16 cu. ft. per batch, plus the usual 10% overload, this assures you 50 cu. yds. of concrete per hour — with a small crew — on your main-highway paving jobs.

While its usefulness is unlimited as a general-purpose paver, this versatile Koehring 16-E also serves as a mobile concrete mix plant. On construction of curbs, gutters, culverts, bridges, pilings, it discharges into overhead hoppers, forms, chutes, or loads trucks. Elevating boom reaches up and out 60° — gives controlled discharge at 21-foot height (higher with special boom).

See for yourself how the big production capacity, overall versatility, and rubber-tired mobility of this Koehring 16-E *twinbatch* can put you miles ahead on your paving schedules. Get all the facts from your Koehring distributor, or write us for 16-E catalog. Big 34-E *twinbatch* is also available for major highway, airport paving.

KOEHRING Company
Milwaukee 16, Wisconsin

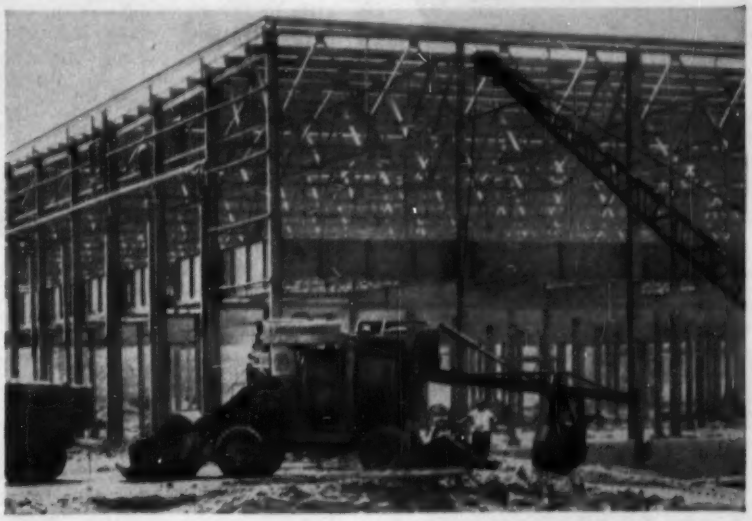
(Koehring Subsidiaries: JOHNSON • PARSONS • KWIK-MIX)

Big rubber-tires are easy on the sub-grade

Notice how there's little or no scuffing on the sub-grade with a Koehring rubber-tired 16-E paver. When working between forms, flotation of the big 11:00 x 20 pneumatic tires protects the grade against surface damage — saves unnecessary filling and re-leveling. This rubber-tired advantage also lets the Koehring 16-E *twinbatch* work on pavement without planking to pour adjoining slabs, widen highway and airport strips, pave intersections, pour concrete for curbs, gutters, culverts.

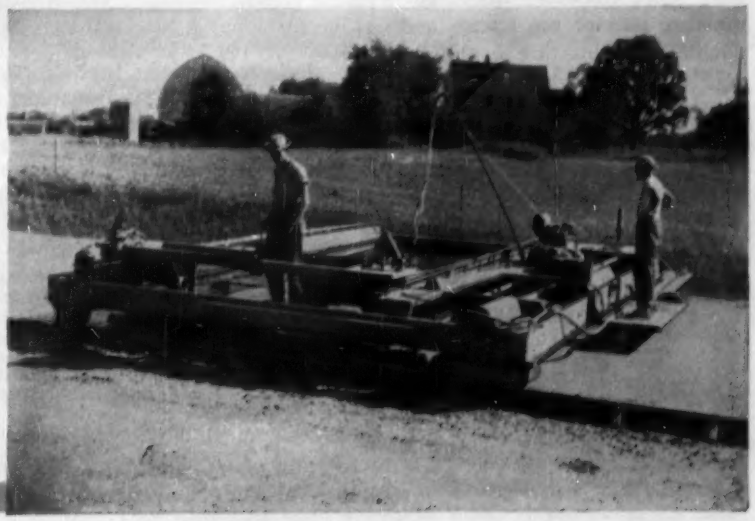
Mobile 16-E paver serves as a concrete mix plant

On building construction, versatile Koehring 16-E *twinbatch* pours footings, floors, columns — is never "grounded". Power-controlled boom swings in a 160° arc, or elevates 60° for overhead discharge — locks and holds in any position. Controlled-discharge bucket dumps anywhere along the 25-foot boom, can be opened or closed at any time for gradual discharge. Water-level capacity of bucket is 24 cu. ft. That's more than ample capacity to hold the full 16 cu. ft. batch of concrete, plus 10% overload.



Precision finisher keeps up with any paver

"Timely", precision-finishing is important on any paving job. Operating at almost twice the speed of a 34-E paver, Koehring Longitudinal Finisher handles all practical consistencies of concrete—harsh, wet or dry. It overcomes slump difficulties on grades and elevated curves. Produces mechanically accurate concrete slab surface, 8 to 30 feet wide, with uniform crown transitions.



FOR A MOBILE HOISTING RIG

ON MOST HEAVY CONSTRUCTION projects there are innumerable jobs of lifting or hoisting. Often it's imperative to get to the scene quickly. That's where a mobile tractor-mounted Carco winch pays off. For loading and unloading, lifting heavy machinery, pipe and fabricated steel, setting poles, and numerous other work, a Carco winch provides maneuverable lifting power. For a Carco winch, through its rugged, constant mesh gear train, efficiently takes the drawbar pull of the tractor and doubles it for hoisting or pulling. And the Carco winch line gives the added "reach" necessary to handle even an inaccessible load. See your nearest Carco dealer. PACIFIC CAR AND FOUNDRY COMPANY. Branches at Portland, Ore., and Franklin Park, Ill.

50TH ANNIVERSARY
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WINCHES
For All Industrial Tractors

CARCO®

BATCH PLANTS, like this Madsen, produce 750 lb to 4,000 lb of paving material per batch. There are larger plants, but usually it is better to use several smaller plants.

or 5%. Add the 57.5% you have determined you should take from bin No. 1 and the 5% to come from bin No. 3 and subtract the total from 100 to get the percentage — 37.5%—of the total aggregate which must come from bin No. 2.

Table IV shows the detailed gradation of aggregate compared with the approved job mix formula.

Specifications usually allow certain tolerances. These variations from the approved mix are well within acceptable limits. Even greater variations would be acceptable to avoid excessive overrun or underrun of any of the bins so long as satisfactory density and stability values resulted.

Table IV

Sieve Size	Bin No. 1 Total % Passing	(a) x57.5%	Bin No. 2 Total % Passing	(b) x37.5%	Bin No. 3 Filler Material Total % Passing	(c) x5.0%	Plant Grad. (a+b+c)	Approved Grad.	Variations
1 in.	100	57.5	100	37.5	100	5.0	100.0	100	0
½ in.	61	35.1	100	37.5	100	5.0	77.6	75.6	+2.0
No. 4	7	4.0	100	37.5	100	5.0	46.5	46.5	0
No. 10	3	1.7	82	30.7	100	5.0	37.4	37.3	+0.1
No. 40	1	0.6	48	18.0	100	5.0	23.6	24.7	-1.1
No. 80	0	0	34	12.7	97	4.8	17.5	17.9	-0.4
No. 200	0	0	7	2.6	88	4.4	7.0	7.4	-0.4

Here's how to compute the paving plant formula in percentages and pounds per batch. You already have computed aggregate on the basis of 100%, so aggregate plus asphalt amount to 106.5%. The weight of the total aggregate in a 4,000-lb batch then is 4,000 lb divided by 106.5, or 3,750 lb. Weight of the asphalt is the remainder, or 250 lb. So the plant formula is:

Table V

	Percentage	Pounds
Bin No. 1	57.5	2,156
Bin No. 2	37.5	1,406
Bin No. 3	5.0	188
Aggregate total	100.0	3,750
Asphalt		250
Total batch weight		4,000

If the trial proportions calculated in Table IV had deviated substantially from the approved grading, it would have been necessary to try new percentages to bring the combination within the desired limits. Sometimes no combination can be found to satisfy specifications. In that case, it may be advisable to start all over again by preparing trial mixtures from samples of aggregates in the plant bins, rather than from the original aggregates. Occasionally, aggregates are so altered in drying as to make this necessary. On the other hand, many aggregates are of such high quality that it is almost impossible to mix a poor pavement.

After the plant-mix formula has been established, you should determine the density of a laboratory-compacted sample. This will serve later as a check on the efficiency of compaction and on field densities. Samples of the finished pavement usually must show not less than 95% of the density of laboratory compacted specimens.

Cold-Laid Mixtures

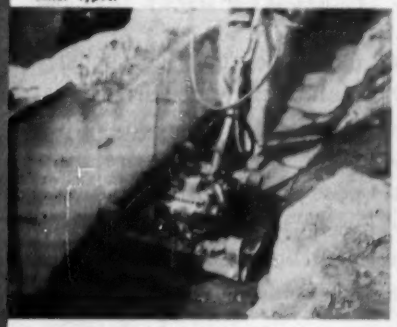
So far all this description of design procedure applies to hot-laid asphaltic concrete and other hot-mix plant types. For cold-laid plant mixtures, you must rely on visual inspection and experience. Trial mixtures should be examined to see that all mineral particles are thoroughly coated. The loose mixture should be cured or aerated until it would be suitable for compaction in actual construction. Then, it should be thoroughly com-

10 LEADS TO BETTER, and BIGGER *FASTER RESULTS* PROFITS!

MACADAM DENSIFICATION. The Jackson Multiple Compactor consolidates granular soil sub-bases and base courses of sand, gravel, rock or slag in half the time required with equipment of other types.

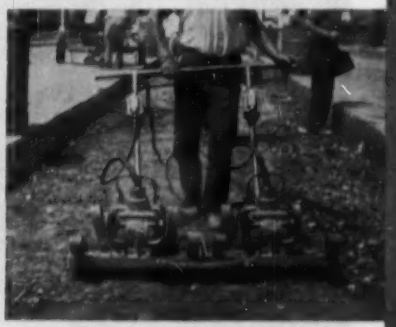
PAVEMENT WIDENING. The Multiple Compactor can be quickly converted to provide in ONE PASS 100% of required density in granular soil sub-bases and rock courses in any widening project.

GRANULAR SOIL FILLS. The Multiple Compactor quickly achieves specified density, gets into places bigger, more expensive equipment cannot reach. Individual units can be detached, operated as manually guided compactors.

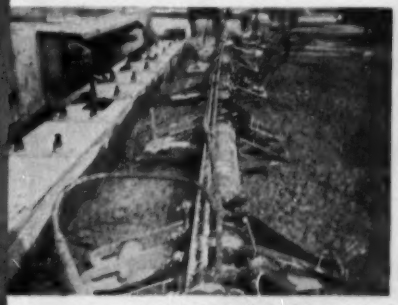


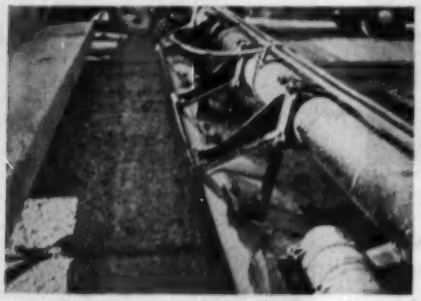
SOIL COMPACTION. Self-propelling, the JACKSON COMPACTOR, with 12" to 26" interchangeable bases, achieves specified density of granular soils in 8" to 10" depths at 2000 sq. ft. per hr. Perfect for bridge and pipe line fills, concrete floor sub-bases, etc.

BLACKTOP WIDENING & PATCHING. The same machine operated from power plant on auto-trailer with pickup for Compactor is most efficient means of blacktop pavement patching, paving walks, drives, etc. Will compact up to 2000 sq. ft. per hr. close to maximum density.



TWIN-UNITS — ONE OPERATOR. With a two-unit, side-by-side or tandem hookup of JACKSON COMPACTORS, one man can readily do the work of two, since the compactors are self-propelling and he has only to guide them.





CONCRETE VIBRATION FOR HIGHWAY AND AIRPORT PAVING

INTERNAL TYPE: super-powered, gives full width internal vibration through full depth of very thick slabs. Saves time, cement; provides greater density and compressive strength. Attaches to finisher or spreader.

SURFACE TYPE: does perfect job of vibrating all mixes in depths used on highway projects. The owner of a JACKSON Paving Tube can quickly switch from internal to external vibration, or vice versa, at minimum expense.

MUNICIPAL PAVING: This vibratory screed strikes off to all crowns, undercuts at curb or sideform, works right up to and around obstructions, is rolled back for second passes on 4 rollers. Most productive and convenient screed made.

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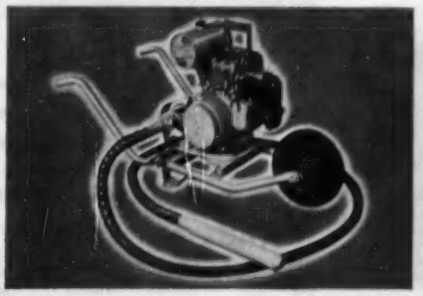
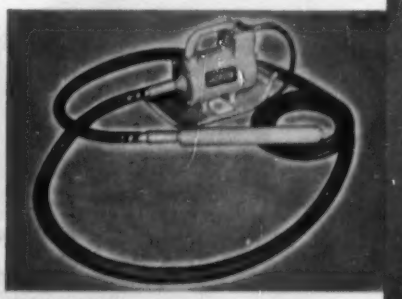
LUDINGTON, MICHIGAN





GENERAL CONSTRUCTION

(Left); 6 H.P. engine-driven, flexible shaft vibrator. Excellent for both thin and thick sections. (Right); 2½ H.P. electric vibrator (for light-socket operation). Handy as a pocket in a shirt, powerful enough to handle all general construction concrete vibration with shafts up to 28'.

Cut down man hours! Speed up hole drilling!

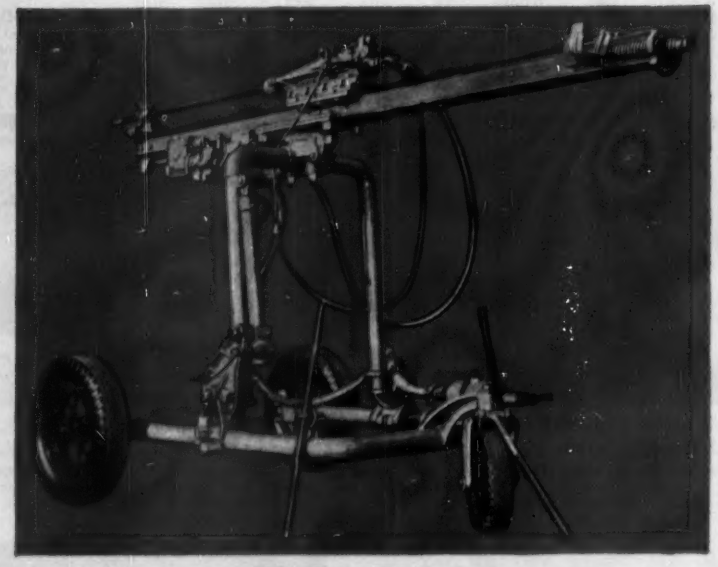
2 new more powerful Thor wagon drills!

THOR SW-1

Compact size—3 wheel reinforced rig • Weight with model 75 drifter—768 lbs. • 2 handle controls movable along mast • Handles up to 3½" bore drifter • New centralizer swings out of way for close drilling • Mast swings 360° vertical or horizontal • Wet or dry operation

General purpose SW-1 • Heavy duty BW-2

Now Thor offers two new wagon drills to fit every drilling requirement — wagon drills which will outperform and out-last other models. Drill holes in any direction, at any angle, on level or sloped ground. One man operation cuts costly man hours. Check these features on the new heavy duty BW-2 and the general purpose SW-1 and then call your Thor contractors tool distributor for a free trial of the model that fits your job.



THOR BW-2

5 h.p. rotary air motor • 3 wheel reinforced heavy-duty rig • Variable speed control • Motor and controls movable along mast • Wet or dry operation • Mast swings 360° vertical and horizontal • New centralizer swings out of way for close drilling • 800 to 1000 lbs. pulling power for steel removal • Spring buffer prevents chain breakage • Equipped with Thor 105 drifter. (4" bore)

Thor PORTABLE POWER TOOLS

THOR POWER TOOL COMPANY, AURORA, ILL.

Atlanta	Chicago	Detroit	Newark	St. Louis	Export Division,
Birmingham	Cincinnati	Houston	Long Island City, N.Y.	San Francisco	New York City
Boston	Cleveland	Los Angeles	Philadelphia	Seattle	
Buffalo	Denver	Milwaukee	Pittsburgh	Toronto Canada	

PLANT-MIX PAVEMENTS . . . continued from page 96

pacted in metal cylinders of 4 in. to 6 in. and the upper surface examined to see if it shows any excess asphalt. If so, particularly if the upper portion can be indented easily, you should reduce the percentage of asphalt. If the mix is dry or crumbly, you should add more asphalt.

For emulsified asphalt dense graded mixtures, use this formula to determine the percentage of emulsion:

$$P = \frac{(.05A + .12B + .6C) \times K}{\text{Percentage Residue}}$$

In the formula, P equals the total percentage by weight of emulsion based on the weight of the graded mineral aggregate. A equals the percentage of the aggregate retained on a No. 10 sieve. B equals the percentage of aggregate passing a No. 10 sieve and retained on a No. 200 sieve. C equals the percentage of aggregate passing a No. 200 sieve.

K should vary between 55 and 65. For hard, silicious, non-absorptive aggregate, use 55. For soft, porous, absorptive limestones, use 65. Experience is the only guide to fixing the value of the K factor.

This formula should not be used with open gradations or with so-called "skip" gradation material. It is correct only if you stick closely to the mean aggregate gradations outlined in last month's article (CM&E Dec., p. 121).

Equipment

You need good equipment to construct good pavements. Such great advances in equipment design have been made in recent years that any contractor who does paving work should maintain close contact with manufacturers of equipment.

It will pay the contractor to know the rated capacity of his machines, their maximum capacity, the best working capacity with minimum maintenance.

Most manufacturers maintain field organizations with experts to help on set-up and first operation. And they provide manuals advising on fuels, lubricants, and the best methods of operation. Any contractor who fails to take advantage of these services is ignoring an excellent way to improve the efficiency of his operation.

Summary

1. There are several well-established methods to design hot-mix, hot-laid, asphalt plant mixtures. The important consideration for the contractor is how to explore each situation so as to find the most economical combination of asphalt and aggregate.

2. A large volume of potential business awaits the alert contractor with a highway paving contract. He has the opportunity to sign up a lot of incidental work along the route. He can offer farmers a real bargain because he can do this work at reasonable cost.

3. Design of a mix varies according to conditions of use. For example, a pavement under heavy traffic will close gradually to a dense, uniform condition; required asphalt content of the mix may be about 6%. But the mix for the curb adjacent to the roadway, where there is no traffic, must be of a consistency that will provide a completely closed texture under the finishing operation; required asphalt content may be 7% or 8%, plus a higher percentage of fine aggregate.

No clutter or confusion at paving site. Premixed concrete delivered by Dumpcretes ready for placing.

PAVING ON THE OHIO TURNPIKE

Non-agitated Hauling Meets Every Test

On sections C-2 and C-3 of the Ohio Turnpike there's no clutter at the paving site. No paver, no water trucks, no men to run them.

Just spreaders and finishers, plus a Dumpcrete or two discharging 4 yards of premixed concrete in 60 seconds.

The automatic central mixing plant is midway on the 10-mile job. Three men run it. 14 Dumpcretes haul its 95,000 yd. production.

Here's the bonus. The single plant supplies concrete for bridges, culverts, walls and widening as well as paving.

"It's an efficient, high-production operation. We like it," says D. W. Winkelman, contractor.

This method cuts costs on small jobs, too. It's approved by 25 state highway departments. Write for bulletins today.

Central mixing plant located midway on job.

Slump, cylinder, beam and air test (above) all O.K.

Manufacturing Division, Maxon Construction Co., Inc.
2600 Far Hills Ave., Dayton 9, Ohio 721

Send Me ☐ Paving on the Ohio Turnpike ☐ 8 Ways to Set Up For Central Mixing

Name_____

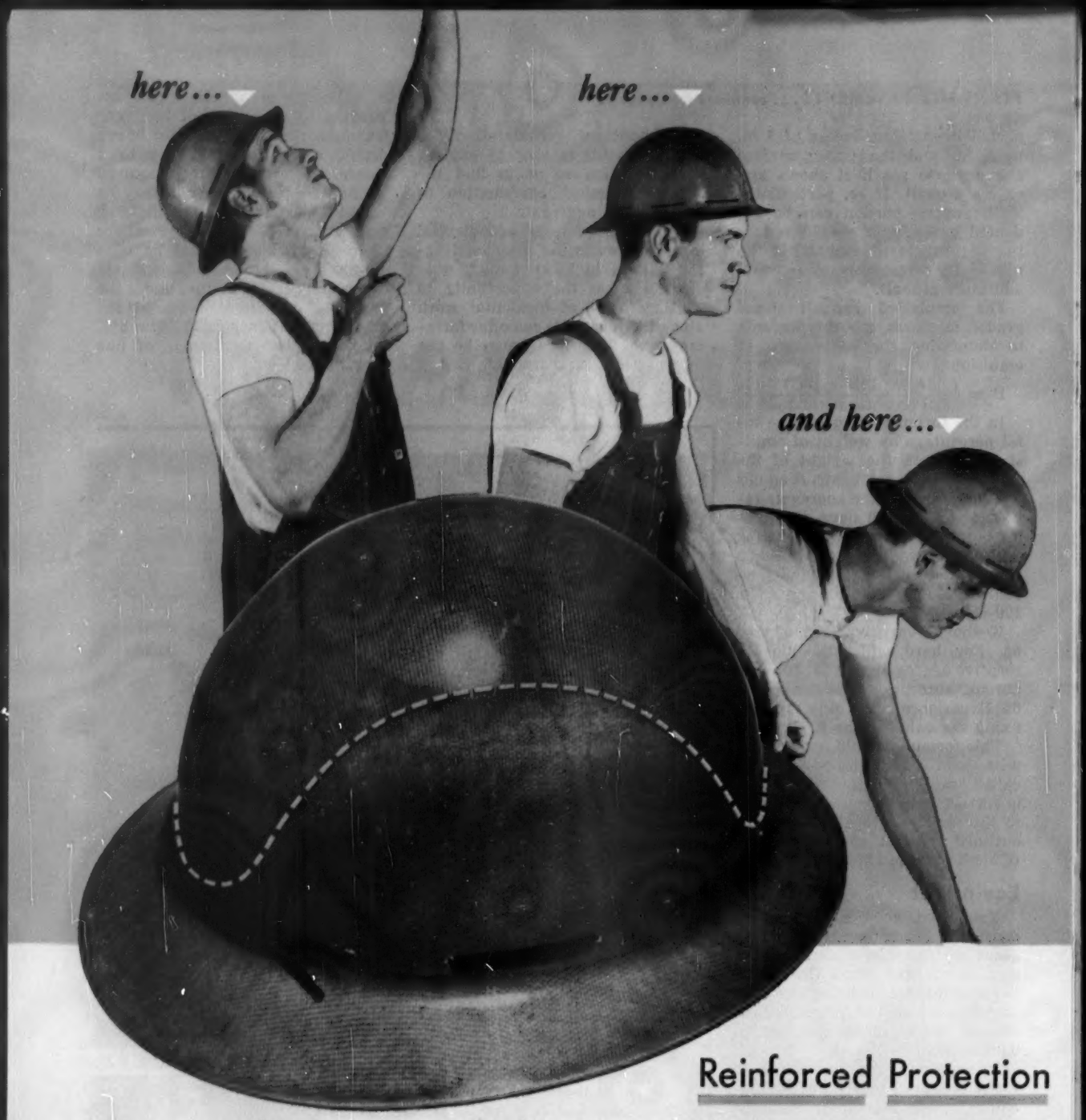
Firm_____

Street_____

City_____

MAXON DUMPCRETE

Fastest from plant to pour



Reinforced Protection

where it's needed most—in the **DANGER ZONE**

. . . an exclusive **M·S·A SKULLGARD** feature

The dotted line around the Skullgard above bounds the *danger zone* . . . the front, top, and back areas of a hat that working positions expose most often to impact. Extra protection in this danger zone area, exclusive with M·S·A Skullgards, is the result of new molding techniques, better materials, improved production methods. And it's added protection without added weight! Get the facts on this all-important M·S·A development. Write for details.

M·S·A
SAFETY EQUIPMENT HEADQUARTERS

Call the M·S·A Man on your every safety problem . . . his job is to help you

MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service: 82 Branch Offices in the United States and Canada

NEWEST PAYLOADER® MODEL sets the pace for a bomber base

Here is the starting point of Peter Kiewit Sons "production line" for concrete placing at a large bomber base — a Hough model HH "PAYLOADER" tractor-shovel feeding a belt conveyor with sand and gravel from adjoining stockpiles. The task of the "PAYLOADER" is a crucial one, because failure at this point would bring the entire concrete-placing operation to a standstill.

Peter Kiewit Sons, one of the largest and most progressive of heavy contractors, have been using "PAYLOADER" tractor-shovels for years on their contracts all over the United States. You too, can depend on the proven performance of "PAYLOADER" tractor-shovels and on the large and reliable Distributor organization that sells and services them, both at home and abroad.

PAYLOADER®
MANUFACTURED BY
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

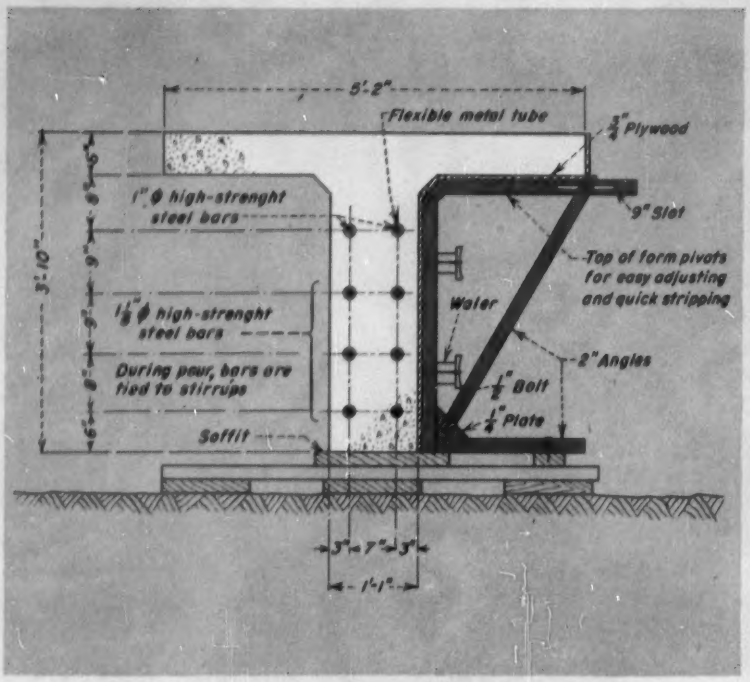
This model HH is one of three completely-new 4-wheel-drive "PAYLOADER" tractor-shovels. They all have a sensational new kind of bucket arm design that provides 40 degrees of bucket tip-back at ground level, powerful pry-out action plus unusual safety, stability and visibility factors.

THE FRANK G. HOUGH CO.
704 Sunnyside Ave., Libertyville, Ill.

Send data on new 4-wheel drive units

- ☐ Model HU—1 cu. yd.
- ☐ Model HH—1½ cu. yd.
- ☐ Model HO—2 cu. yd.
- ☐ Smaller "PAYLOADER" units

Name_____
Title_____
Company_____
Street_____
City_____
State_____



T-SHAPED GIRDER 60 ft long is cast on wood soffit. Side form panels are made of plywood backed by steel brackets. Five sets of forms will get about 40 reuses.

STEEL BRACKETS support form panel. Pins in side of form hold prestress bars in curve.

Simple Forming and Tensioning

PRESTRESSED GIRDERS for a new overpass in New Orleans, La., are being turned out fast. There are two good reasons for this speed: Forms are simple to assemble and strip, and high-strength bars are easy to stress.

The job calls for a 1,422-ft overpass to carry Wisner Drive over a main railroad track. There are 23 spans, each carrying eight T-shaped girders 6 ft 8 in. apart. There are 192 girders—60 ft long, except at one span where they are 42 ft. The $806,000 contract, including 24 pile-supported piers, is being carried out by Keller Construction Corp. of New Orleans.

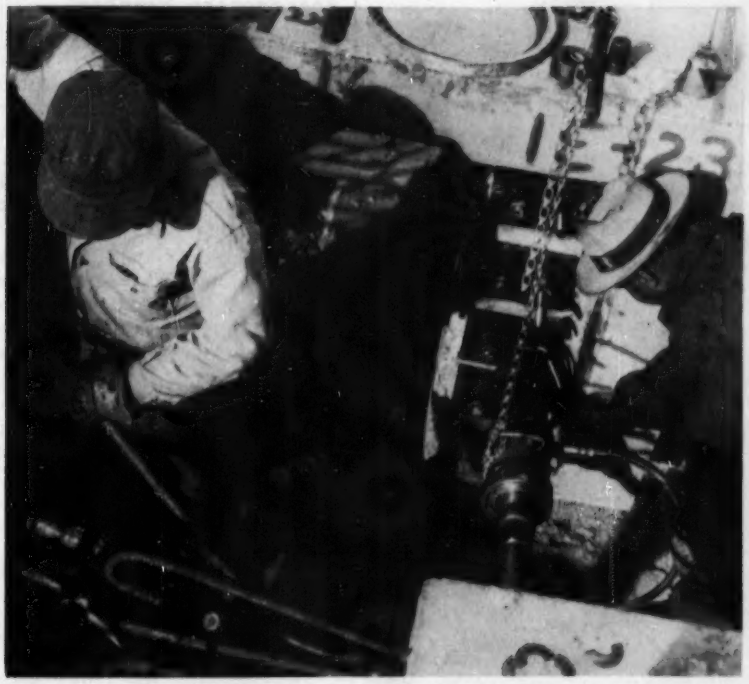
Keller's schedule calls for casting about 15 girders per week. He uses only five sets of forms and will get about 40 reuses. Girders are cast on the site along the full length of the overpass. This makes it possible for a crane to pick them up, walk a short distance, and place them on the piers. There is no rehandling.

To distribute the heavy weight to the ground, each 30-ton girder is poured on a wood soffit supported by heavy planks. The soffit is shimmed to provide the required camber.

Side forms consist of 8-ft long plywood panels backed by adjustable angle brackets 16 in. apart. The form section under the flange of the T-shaped unit is easily adjusted to the pitch of the roadway. It pivots on a ½-in. bolt and is anchored in position by a diagonal brace that bolts through a slotted hole in the top angle. Opposite forms are held together with snap ties that buck against double 2x4 walers.

Form erection is tricky. The high-strength bars must be placed in a definite catenary curve and held rigidly in position during pouring. To do this, Keller first

CONCRETE mixed in paver is dumped into form for T-shaped girder. Forms are stripped next day and reused. They may be reused 40 times. Concrete's design strength is 6000 psi.



HIGH-STRENGTH BARS are quickly stressed by Simplex 60-ton jacks. Pair of bars is stressed simultaneously by jacks at each end to prevent cracking from unequal stresses.

Speed Prestressing

erects one complete side of forms. This is simple, because the brackets make the form self-supporting. Stirrups are then placed the full length of the girder. Pins are pushed through holes in the forms at eight points, their ends supported by simple steel templates held temporarily by workmen. When the bottom two steel bars, already fed into flexible metal tubes, are laid over the pins, the bars bend in the proper catenary. Then they are quickly tied to the stirrups.

To place the next two bars, the pins are pulled out, inserted in a set of higher holes, held in the template, and the procedure is repeated. When all eight bars are tied, the opposite side forms are erected and reinforcing is placed in the flange. A segmented end form acts as a chair under the protruding bars.

Bulkheads are placed at each end and the girder is poured. Concrete is mixed on the site in a single-drum paver, chuted into a crane-handled bucket, and dumped into the forms. A master vibrator with 1¼-in. head consolidates the mix. Concrete is made with eight sacks of cement per cu yd and a water cement ratio of 3.7 gal per sack of cement. Forms are stripped the day after the pour and the girder is water-cured with burlap.

Stressing

When a girder reaches its design strength of 6,000 psi, it is ready for stressing. First, steel jacking plates are placed over the ends of each pair of Stressteel bars, and washers and nuts are turned up over the threaded ends.

To prevent temporary stresses from cracking the concrete, the second pair of bars from the top is stressed first. As an added precaution, the two bars are jacked simultaneously, one jack at each end of the girder.

The jacking procedure is simple. First, a wrench is placed over the nut to enable a workman to turn up the nut as the bar is pulled. An adapter is then threaded over the end of the bar, and a Simplex 60-ton center-hole jack is fitted over it. The jack is hung by a chain from a bent reinforcing rod anchored temporarily in a hole in the top of the girder.

When the two jacks are in position, a signal from a foreman starts the operation. By means of hand pumps, the load is applied in increments of 10 tons. The body of

ADAPTER for center-hole jack is screwed on to threaded end of 1-1/8-in. Stressteel bar.

WORKMAN turns up nut as jack stresses bar. Bent reinforcing bar supports jack.

RECESS for end anchors is grouted before erection. Cranes place 30-ton girders.

...CONTINENTAL
RED SEAL
CUSHIONED POWER

Wherever you go, these days, you see men at work re-shaping the landscape with the aid of specialized machines. And no matter what the specific job—clearing land, ditching for irrigation, grading for highways, laying pavement or erecting buildings—you'll note a pronounced swing to equipment with Continental power. . . . The adoption of dependable Red Seals—gasoline or Cushioned Power Diesel—by more and more leading builders of specialized machines, reflects a spreading recognition, on the part of machine *users*, of this basic fact: There's a vast difference, in performance, dependability, economy and upkeep cost, between the ordinary engine and the Continental that's engineered and built for its job.

•

ONE BIG REASON WHY THE NEW TERRATRAC MODEL 600 IS SETTING NEW SALES RECORDS ALL OVER THE COUNTRY IS THE FACT THAT THIS TRACTOR AND ITS CUSHIONED POWER DIESEL ENGINE ARE ENGINEERED AS A UNIT. TERRATRAC MODEL 600 IS AN OUTSTANDING EXAMPLE OF HEAVY DUTY EQUIPMENT WITH BUILT-FOR-THE-JOB POWER.

CONTINENTAL MOTORS · Powerful as the Nation · AMERICA'S STANDARD

Continental Motors Corporation
MUSKEGON • MICHIGAN

6 EAST 45TH ST., NEW YORK 17, NEW YORK • 3017 S. SANTA FE AVE., LOS ANGELES 58, CALIF.
6318 CEDAR SPRINGS ROAD, DALLAS 9, TEXAS • 910 S. BOSTON ST., ROOM 1008, TULSA, OKLA.
1252 OAKLEIGH DRIVE, EAST POINT (ATLANTA) GA.

PRESTRESSED GIRDERS...

continued from page 103

the jack bucks against the plates through a steel frame. Stressing continues until the bars elongate an average of 2¾ in., producing a stress of about 100,000 psi. The nuts are then turned up tight, and the jacks removed.

The procedure is repeated next with the lower pair of bars, then the top pair, and finally the bottom pair. With a four-man crew, Keller stresses an average of 25 girders per week.

After a girder is stressed, grout is pumped into the space around the bars. Small pipes cast in the concrete carry the grout into the flexible metal tubes that cover the Stressteel bars. When this is complete, the recesses at the ends of the girder are filled with concrete, providing a smooth end surface.

Erection

Erection of the big 30-ton girders is being handled entirely by a Koehring 1005 crane. Using a two-point pickup with an equalizing device, the crane picks a girder off its soffit, walks a short distance, and places it on its piers. Girders are set 6 ft 8 in. apart, leaving 18-in. gaps between adjacent flanges. The gap is poured in place after precast diaphragms are inserted between girders. A complete one-span unit is stressed transversely. Before stressing, diaphragms are supported on angles cast in the girders.

The structure carries two 24-ft wide roadways, separated by a 4-ft median strip. Piers consist of twin circular columns formed by Sonotubes. Columns rest on clusters of Raymond cast-in-place piles 90 ft long.

Built for the City of New Orleans, the bridge is one of the final projects in the current Union Passenger and grade crossing elimination program.

The $57 million program included the unification of five sets of passenger tracks, replacement of five scattered and obsolete depots, elimination of 144 grade crossings, and construction of new arterial streets that tie in with the new terminal. It also makes miles of old and now abandoned rail lines available for new streets.

Jack Stone is superintendent for Keller Construction Corp. and Roy Walters is resident engineer for George Heft, consulting engineer.

LOADED

with *PROFIT-MAKING* Features

More and more jobs today call for big crane capacity —plus *fast mobility*. Lorain's ability to produce this combination of capacity and mobility, to meet any conditions, explains why more and more Lorain Moto-Cranes are going to work. These rubber-tire cranes are "loaded" with the kind of features that mean better performance, lower costs and higher profits. In the Lorain Moto-Crane line, you select from the capacities below in combination with a wide variety of tire, axle and drive arrangements to meet all traction and travel conditions. Best of all, you get the Lorain designed and built Moto-Crane carrier, designed specifically for this type of work and loadings . . . and available in some models as an "8 x 4". Don't settle for less, when a Moto-Crane gives you so much for your money!

ONLY LORAIN OFFERS THIS SELECTION

Here are a few Lorain Moto-Crane features:

• Front wheel drives • 3 and 4 axle carriers* • Dual controls for self-propelled service • Removable counterweights for road travel* • Multiple position turntable mountings, adjustable for shovel-hoe-drag ranges or top crane capacity* • Precision boom lowering device • Pin-connected tubular chord booms for maximum capacity at minimum weight* • 2-piece, extensible tip extensions* • High gantries* • Ability to back-down-the-load • Third drum • Precision power load lowering . . . and there are many more.*

See your Thew-Lorain Distributor for all the facts.

THE THEW SHOVEL CO., LORAIN, OHIO, U.S.A.

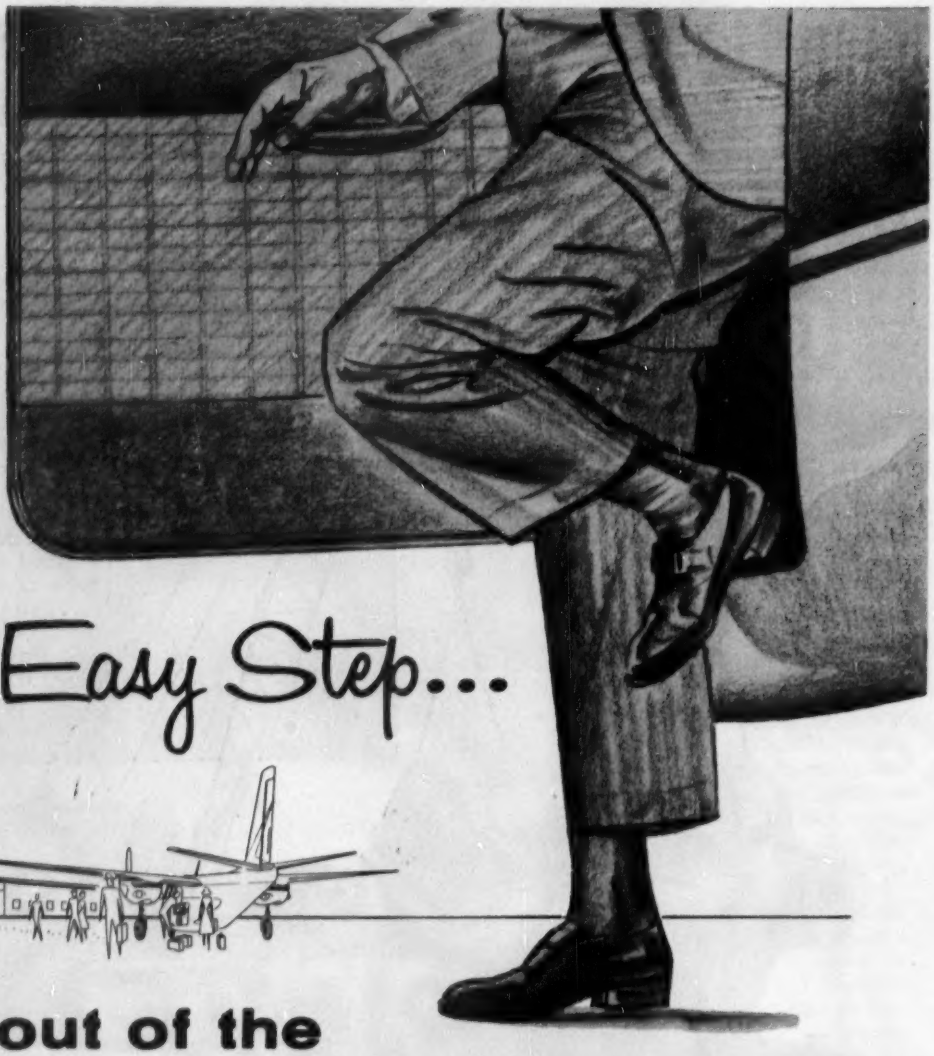
*Not on all models . . . not all equipment listed is standard.

MODEL	CAPACITY	MODEL	CAPACITY
DIXIE	6-TON	MC-424W*	22½-TON
MC-110	10-TON	MC-425	25-TON
MC-254	15-TON	MC-425W*	25-TON
MC-254W*	17½-TON	MC-524	30-TON
MC-424	22½-TON	MC-824	45-TON

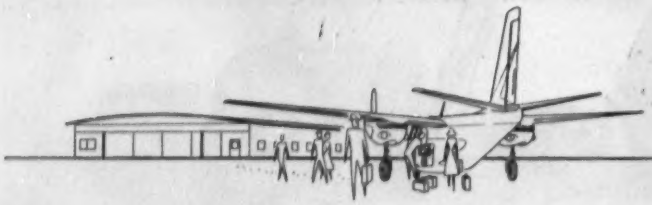
*Extra-wide carriers for maximum lifting capacities "on rubber," without outriggers.

THEW **LORAIN.**

MOTO CRANE



One Easy Step...



in or out of the TWO GREAT COMMANDERS

Ease of entrance has been a popular feature of the AERO COMMANDER from the very start. One easy step for passengers and knee-high loading of luggage and cargo typifies the convenience and comfort features built into these 5-7 place twin-engine executive transports. The same high wing design that gives the AERO COMMANDER'S positive stability in flight makes possible this effortless dignified entrance in both the 680 SUPER and the 560-A.

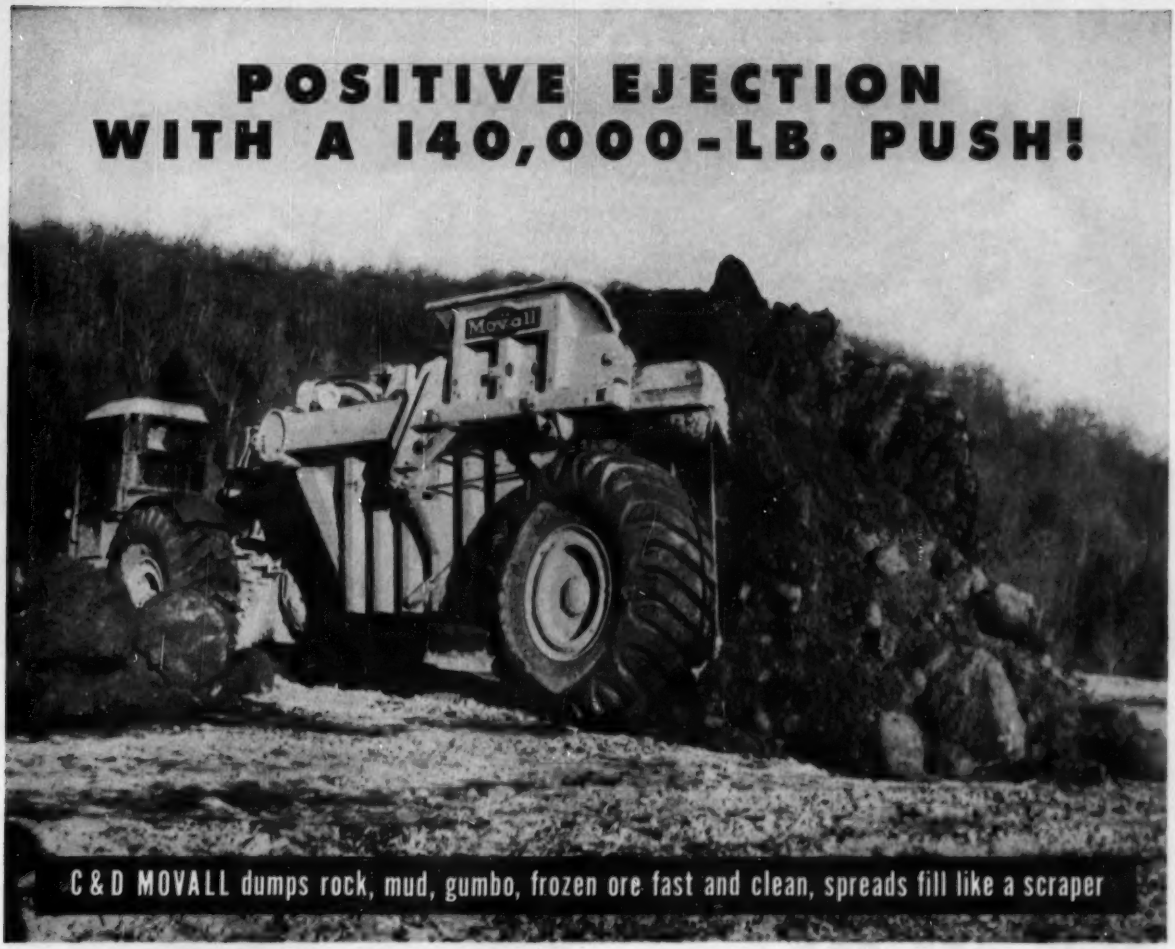
AERO Commander

560-A · 680-SUPER

WRITE FOR CATALOG 133-A WRITE FOR CATALOG 133-S

AERO DESIGN & ENGINEERING CO • TULAKES AIRPORT • P. O. BOX 118 • BETHANY, OKLAHOMA

POSITIVE EJECTION WITH A 140,000-LB. PUSH!



QUICK & CLEAN... Caterpillar DW21 powered MOVALL dumps mucky mud and rock mixture whistle-clean in 12 to 14 seconds on Geo. M. Brewster & Son's New York Thruway job, near West Nyack, New York.

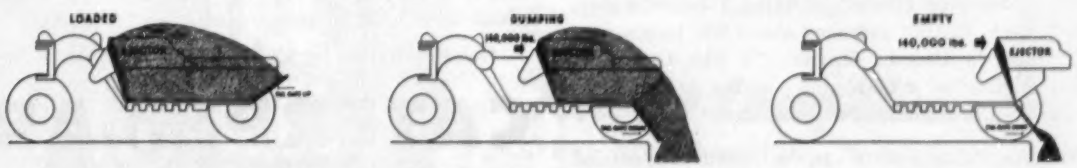
C & D MOVALL's "scraper-in-reverse" design puts a 140,000-pound push behind the ejector for unloading. This gives you positive ejection and controlled dump or spread for handling any material you can load with shovel, dragline or belt loader. MOVALL can place the load where and how you want it... over the edge of a fill, spread in even lifts of any desired depth, or into hoppers at a controlled rate. The 140,000-pound push scrapes the bowl whistle-clean, even in mud, gumbo, or frozen ore.

3 BIG ADVANTAGES

The MOVALL offers you the widest work range of any hauling unit available today, enables you to: (1) "tool up" for more types of work for less money; (2) keep your MOVALLS busy on jobs where special-purpose hauling units stand idle; (3) use same Cat DW20 or DW21 prime movers for both scraper and top-loading jobs.

C & D MOVALLS are available for Cat DW20 and DW21 tractors; handle 31-ton, 25 cu. yds. (heaped) loads of any material you can top load. They cost no more than comparable-size limited use wagons; they pay off on many more types of work. See your Caterpillar - C & D dealer, or wire us now about a MOVALL demonstration on your job. C & D MANUFACTURING COMPANY, Perkins (suburb of Sacramento), California; phone HIllcrest 5-8592.

#5



HOW IT WORKS

Movall uses standard cable scraper power control. To dump, operator releases backhaul drum to drop tailgate, engages ejector drum. Eight-part ejector line gives 140,000 lb. push to boost load out fast and clean. Operator has complete control of discharge, controls spread depth by varying travel speed. After dumping, backhaul line closes tailgate and rolls ejector to loading position.

HOW MOBILE CAT* POWER PAYS OFF FOR LAMBERT BROS., INC.

A D397 Mobile Electric Set provides crusher power on a job for Lambert Bros., Inc., near Greenback, Tennessee. The 315 KW D397, Caterpillar's biggest trailer-mounted electric set, is well within highway weight and size restrictions.

When Lambert Bros., Inc., Knoxville, Tennessee, received the contract to furnish 26,000 tons of base material for road construction near Greenback, it set up the operation pictured here. The company provided its own power with this Cat D397 Mobile Electric Set. The 315 KW unit provided the power to run the Cedarapids crusher, working 8 hours a day, 5 days a week. Output averaged about 900 tons a day. Said Lambert's Ben L. Greene: "I like the D397 because it gives us a maximum amount of operation with a minimum amount of maintenance."

For dependable electric power, *when* it's needed and *where* it's needed, you can't beat Caterpillar Electric Sets. They're available in a complete range of sizes, up to 315 KW, for use in emergency or full-time operation. Each is a complete unit, mounted on skids, semi-trailer or trailer. Easy to hook up and easy to operate, they deliver steady voltage. There's one that fits your needs and—as Mr. Greene points out—provides maximum performance with minimum maintenance.

Wherever you move these sets, you always have the plus of prompt service, right on the spot, from your nearby Caterpillar Dealer. For complete information about these versatile power plants, see him soon.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MODERN, HEAVY-DUTY PORTABLE ELECTRIC POWER

WE WANT YOUR TOUGH JOBS!

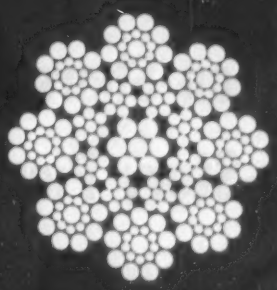
for J&L CenterFit Wire Rope

Three characteristics give J&L CenterFit Wire Rope the staying power to develop outstanding service in applications where shock, fatigue, and heavy loading limit the service life of standard wire rope.

1. CENTERFIT is the strongest standard rope produced.
2. CENTERFIT is more flexible in operation than any standard IWRC rope.
3. CENTERFIT has unsurpassed resistance to shock loading.

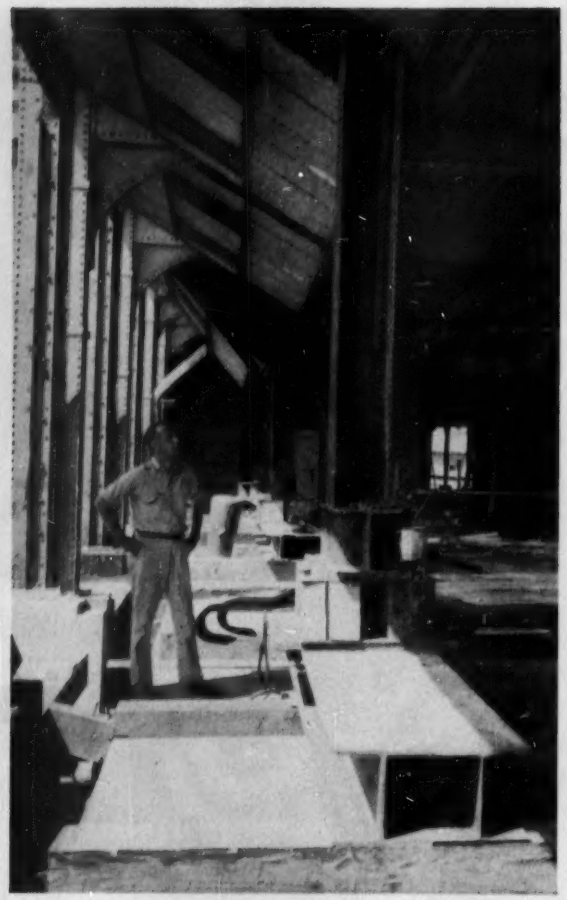
Over the years CenterFit has built a record for outstanding service life on the toughest applications such as shovel hoist ropes, back hoe pull ropes, and clamshell holding and closing lines where overloading is a factor.

If you're operating where loading, shock and fatigue are severe, chances are J&L CenterFit can help you cut your wire rope costs. Contact your nearest J&L Office or representative.

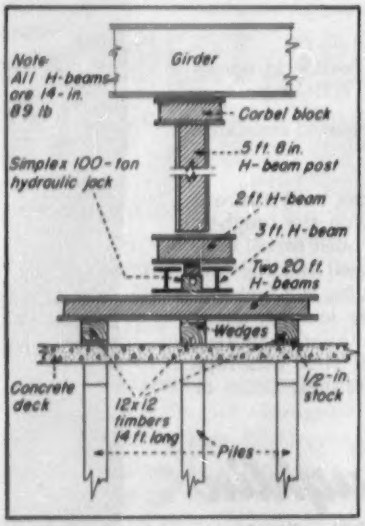


Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

UNUSUAL SHORING PROBLEM confronted the contractor replacing rotted wood piling (shown here) with concrete piers and pile-caps during $1 million rehabilitation of Hoboken, N.J., pier.



ECONOMIC SUPPORT of steel and concrete structure whose weight was unknown, due to the loss of old plans, was made possible by these 70-ton shores designed by Alan N. Spooner & Son, Inc.



SIMPLICITY IS KEY FEATURE of shore. The two 12x12 timbers at the ends are set on ½-in. stock. Each takes half of the 40-ton load applied by hydraulic jack. Center timber, added later, takes an additional 20-ton load and transmits 5 tons to each of the end pieces, fully distributing the load.

Portable 70-Ton Shores Support Two-Story Pier

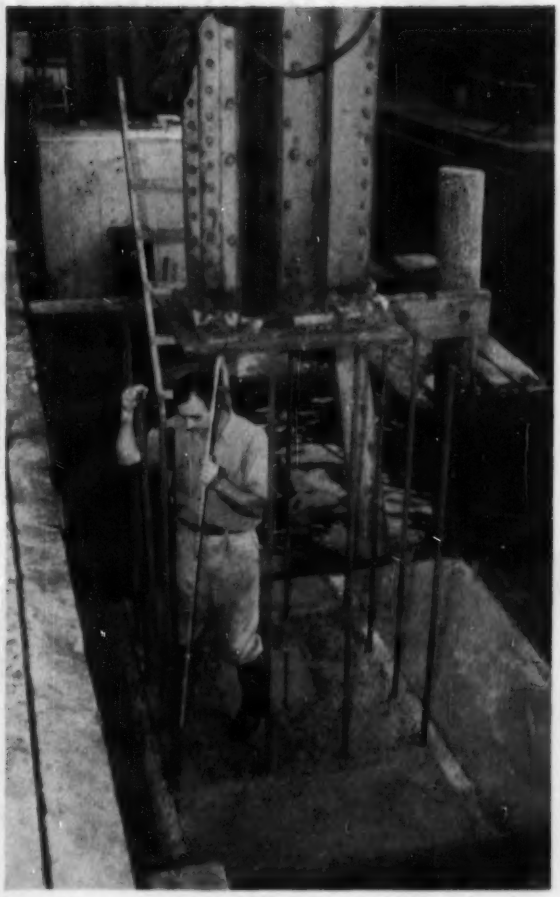
EIGHT PORTABLE SHORES of 70-ton capacity are supporting the superstructure of an ancient two-story pier in Hoboken, N.J., while workmen remove rotted sections of wood piling and replace them with concrete caps and pedestals.

These heavy-duty shores were specially designed when it was discovered there was no way to learn what load the pier's 92 exterior steel columns carried. It was beneath these columns that the work had to be done. But all plans, specifications, and other records pertaining to the 53-yr-old steel and concrete pier had been lost.

Port of New York Authority engineers figured a shore capable of sustaining a 70-ton load per column would be a safe one. But the job of designing the support was left to contractor Alan N. Spooner & Son, Inc., of New York, who holds a $1 million contract to rehabilitate the pier's substructure.

Spooner's chief engineer, C. W. Garrison, decided that the only economical shore would be a single-post, portable one. But designing such a shore raised two problems: 1) It would be hard to make an easily moved shore capable of sustaining a 70-ton load; 2) It would be difficult to eliminate the concen-

CORBEL BLOCK, bolted to shore post, distributes the jacking load along the girder at the top of the shore. Bolting block to post saved time in setting and moving individual pieces.



REINFORCING RODS are set by workman into pile-cap just poured prior to forming-in pier. Once concrete has set for four days, shores are quickly dismantled and moved with ease to new site.

trated punching pressure a single-post shore creates.

Garrison came up with a two-step load distribution method using a lightweight grillage (see diagram) which requires two jacking operations, but cuts down the amount of grillage material needed. This is how it works.

Garrison first sets two 14-ft timbers, 12 ft apart, on the deck over two pieces of ½-in. stock. This provides clearance for a third timber which will be placed between these two later. Over the timbers he builds a grillage of 14-in., 89-lb, H-beams in pairs 20 ft and 3 ft long. A single 2-ft section of beam goes over these.

Another 5-ft 8-in. H-beam acts as a post. It stands on the grillage. To its top workmen bolt a corbel block (a 2-ft H-beam which distributes the top load). The shore is then ready for jacking.

A 100-ton Simplex hydraulic jack distributes a 40-ton load to the deck through the two bottom timbers. Each timber receives 20 tons. Workmen next slip a third timber between the first two and wedge it to the beam, then add an additional 30 tons. The total 70-ton load distribution becomes 25 tons through each end timber and 20 tons through the center one.

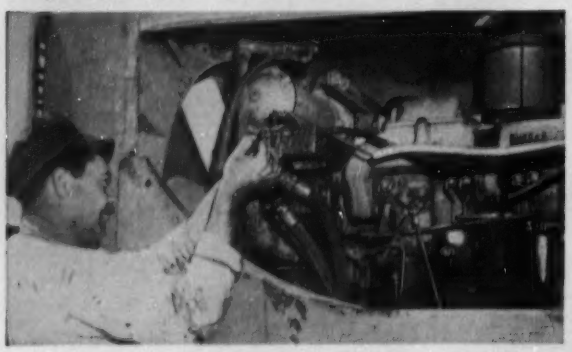
"The two-step jacking operation cost us practically nothing extra in time," Garrison said, "but its saving in more complex grillage made the 70-ton portable shore possible." *(Continued on page 116)*

SIMPLEX HYDRAULIC JACK with 100-ton capacity is the secret of this successful shore. Workman points out gage which indicates load distribution to prevent a concentrated pressure.

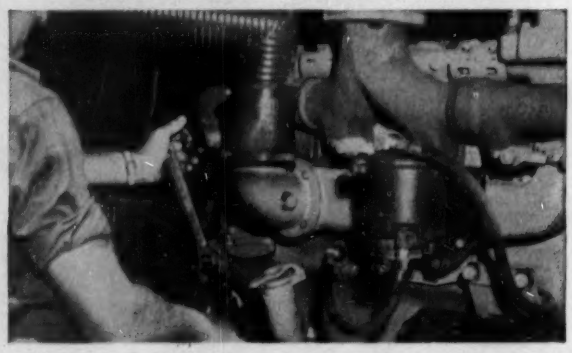
Aeroquip Flexible Hose Lines Help Cut Maintenance Cost for Large Construction Fleet

Georgia Kaolin Co., near Macon, Ga., operates over 100 pieces of heavy earthmoving equipment. Profitable operation calls for quick repairs right in the field.

Radio-dispatched service trucks speed field maintenance. When a hose replacement is needed, Aeroquip hose and reusable fittings are assembled on the spot, cutting downtime to the minimum.



Here a Georgia Kaolin mechanic replaces a broken diesel line with a field assembled Aeroquip hose line. The entire replacement job takes only minutes.



Georgia Kaolin field mechanics have standardized on dependable Aeroquip flexible hose lines for air, water, fuel and oil lines as well as hydraulic lines on trucks, crawlers, scrapers and shovels.

Support Junior Achievement
Junior Achievement Week, January 29-Feb[illegible]ry 4

Maintenance Superintendent P. H. Livingston reports: "Manufacturers' hose replacements would call for too much inventory, not to mention special changeovers. By using the 'bulk hose idea' we replace with Aeroquip and use the fittings over and over."

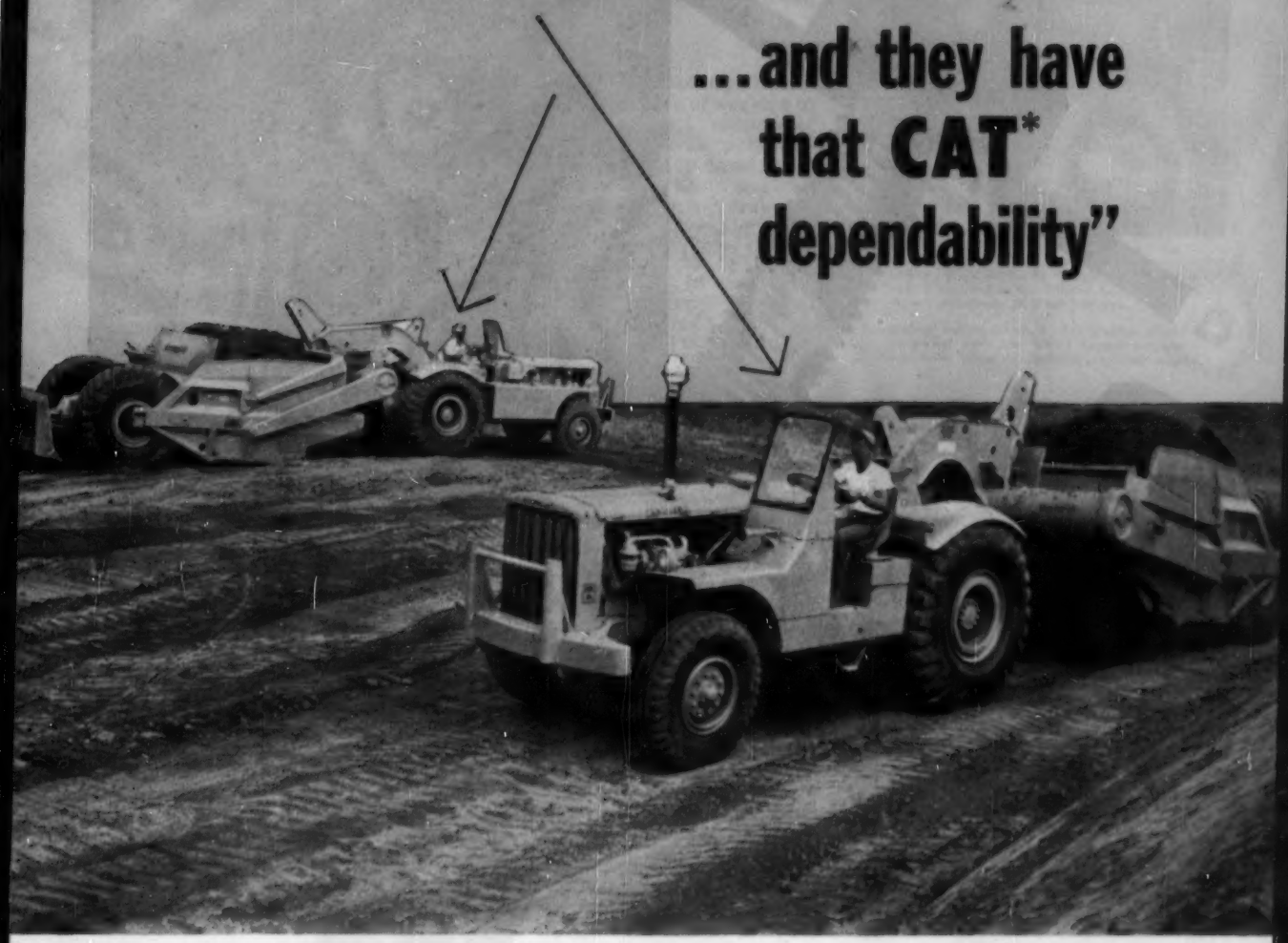
Let your Aeroquip distributor show you the many advantages using Aeroquip Flexible Hose Lines. He's listed in your Yellow Page Directory, or please write for Bulletin 152 on Aeroquip for construction equipment.

Aeroquip
REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

"They move plenty of dirt ...and they have that CAT* dependability"



A county road south of Bloomington, Kansas, had to be straightened. Fill for the job—some 70,000 yards of clay and loam—were to come from changing Kill Creek's channel . . . a big assignment that called for fast-stepping heavy-duty machines. G. W. Christolear, of Heide & Christolear Construction Co., Smith Center, Kansas, says, "We looked the earthmoving equipment field over, watched all makes of rubber-tired machines, talked to the owners, and settled on Caterpillar DW15s. The fact that they move plenty of dirt and have that Cat dependability convinced us."

The DW15s on this job haul heaped loads in their No. 15 Scrapers, making an 800-yard round trip in just over four minutes. They go ten hours a day on only 35 gallons of fuel.

These 186 HP four-wheeled workhorses are designed and built for tough, fast, economical work. They offer ten forward speeds to 24 m.p.h.—to 31.3 m.p.h. with optional gears. They perform especially well in narrow, confined areas. And they work smoothly with a complete line of matched units—with scrapers, and with bottom dump and side dump wagons.

But only a real demonstration can show you the DW15's advantages. Call your Caterpillar Dealer today. And remember, he's always handy with competent service and factory parts—parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

BOLT THE ROCK!

Bethlehem Rock Anchor Bolt is installed by drilling 1¼-in. hole to depth of about 3 in. less than length of bolt. Wedge is started in slot, then bolt is placed wedge-first in hole. While bolt is driven to refusal, wedge is forced into slot, spreading the ends of bolt.

THAT'S THE WAY TO MINIMIZE ROCK SLIDES

If you want to combat rock slides, especially in cuts with high banks or on steep hillsides, you'll find Bethlehem Rock Anchor Bolts an effective method.

Bethlehem Rock Anchor Bolts help prevent serious rock slides because they bolt together the stratified slabs of rock, stabilizing the slope. By effectively reinforcing the rock formation, they make it virtually impossible for layers of rock to slide or fall.

Bethlehem Rock Anchor Bolts are 29/32 in. in diameter, and come in lengths of from 2 ft to 10 ft, and longer. One end of the bolt has 5 in. of 1-in. rolled threads. The opposite end has a 6-in. centered slot, forming the equivalent of two half-rounds. The slot is made by forging. With none of the original cross-sectional area lost during the forging operation, the slotted portion is as strong as the body of the bolt.

If you have any questions about Bethlehem Rock Anchor Bolts, and how you can use them to good advantage, drop a line to the nearest Bethlehem sales office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Contractor Takes Tractair to Church and Solves Unusual Construction Problem

Remodeling of this large church depended on plenty of air power.

"Inside" job was confined, crowded, with poor footing.

Here's how a construction firm found the answer with a Le Roi Tractair.

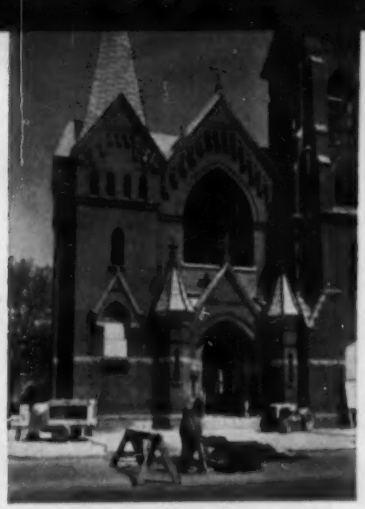
A self-propelled Le Roi Tractair compressor went to church recently to help a Michigan construction company with an unusual air-power problem.

The job was different and difficult. St. Mary's Church in Wausau, Wisconsin was to be remodeled inside, from the ground up. Plenty of air power was needed to work essential tools. But long hose wouldn't work because of friction loss and danger of abrasion from debris. Not even small trucks could get inside the building.

To solve the problem, a Le Roi 125 Tractair, capable of working in crowded conditions . . . maneuvering in tight corners . . . "stepping" through loose, deep sand, was driven into the church. In this way continuous air power was provided for the job, without tying up additional equipment or men.

Ready to work at any job. Tractair, a combination 42-hp wheel tractor and 125-cfm air compressor, can be equipped with a variety of drilling attachments, front-end loader, backhoe, rotary sweeper, backfill blade, and operates Le-Roi-Cleveland air tools — rock drills, pavement breakers, clay spades, backfill tampers.

On this job, the Tractair functioned as a specialized tool providing a complete answer to the need for dependable air power inside the church. The Le Roi Tractair was also used outside the church to break concrete, along with a portable Le Roi Airmaster compressor. On many jobs, the Tractair can replace a truck-towed compressor with a 50% saving in equipment costs and manpower — and unlimited savings in time.

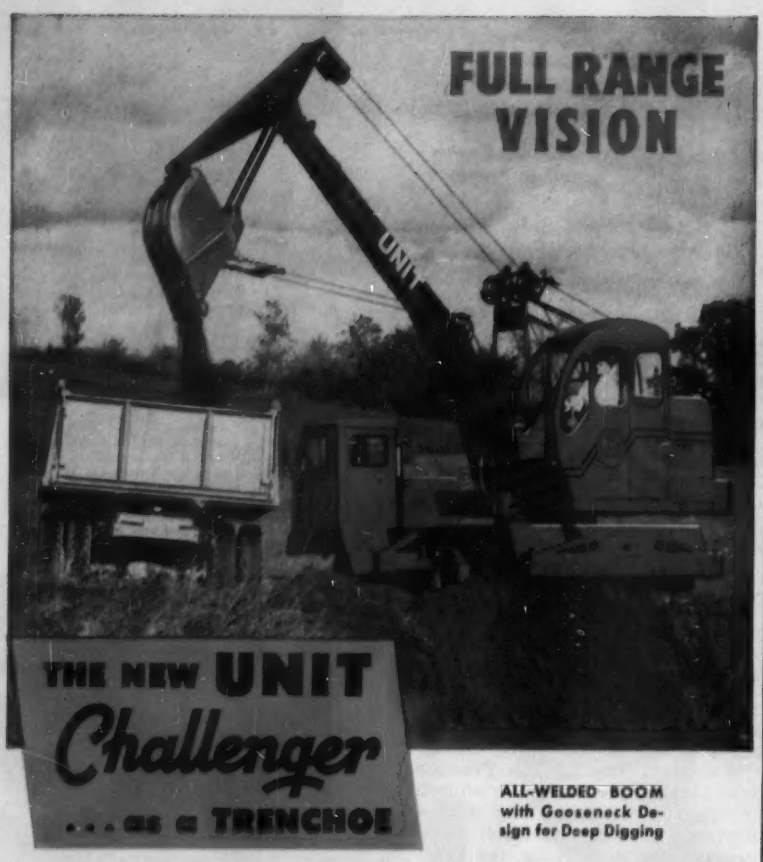


(Above) Work outside St. Mary's church in Wausau, Wis., used Le Roi Tractair and Le Roi Airmaster compressor to break concrete.

(Below) Inside church, Le Roi Tractair provided air power when and where needed because it can move about in confined, crowded places.

Le Roi Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin also manufactures portable and stationary air compressors, air tools, and engines. Write today for information about any of these products.

T-48



ALL-WELDED BOOM with Gooseneck Design for Deep Digging

FAST on the Job...EASY to Handle!

Added to the UNIT line of proven equipment, is the New UNIT CHALLENGER. Here's a modern 3/8-yard machine that provides a perfect combination of design and construction. Packed with new advanced engineering features: **Self-aligning Hook Shoes... Force Feed Lubrication . . . Full Floating Trunnion-Mounted Tapered Drums . . . Torque Converter,** etc., the New UNIT CHALLENGER is the most dependable machine that money can buy.

Bulletin C-800 completely describes and illustrates the New UNIT CHALLENGER.

Send for Bulletin Now

UNIT CRANE & SHOVEL CORP.
6307 W. Burnham St. • Milwaukee 14, Wis., U.S.A.

Geared to boost your earnings!

70-TON SHORES . . .
continued from page 111

. Spooner uses eight sets of these shores. They are placed in line under the girders about 9 ft back from the columns. The load is removed from the columns one by one, and the rotted piling beneath is replaced with concrete caps and pedestals.

The 9-pile clusters of piling and caps are ripped out to just above the low-water mark. Wood clamps secured to the piles below the cut-off support 2x10 tongue-and-groove planking that acts as the bottom form and is left in place after the cap is poured.

Workmen then set the form sides, place reinforcing bars, and pour the 7x9-ft pile-caps. The next day, pedestal forms are placed and concrete is poured up to the foot of the steel column. The concrete is given a four-day set before the shores are dismantled and moved to another section.

Other work at the 949-ft pier includes the placing of additional piles and decking which will widen the structure from 91 to 103 ft. The pier is being rehabilitated for American Export Lines. Harold Garbee is Spooner's superintendent. Col. E. S. Barron, resident engineer, represents the Port Authority.

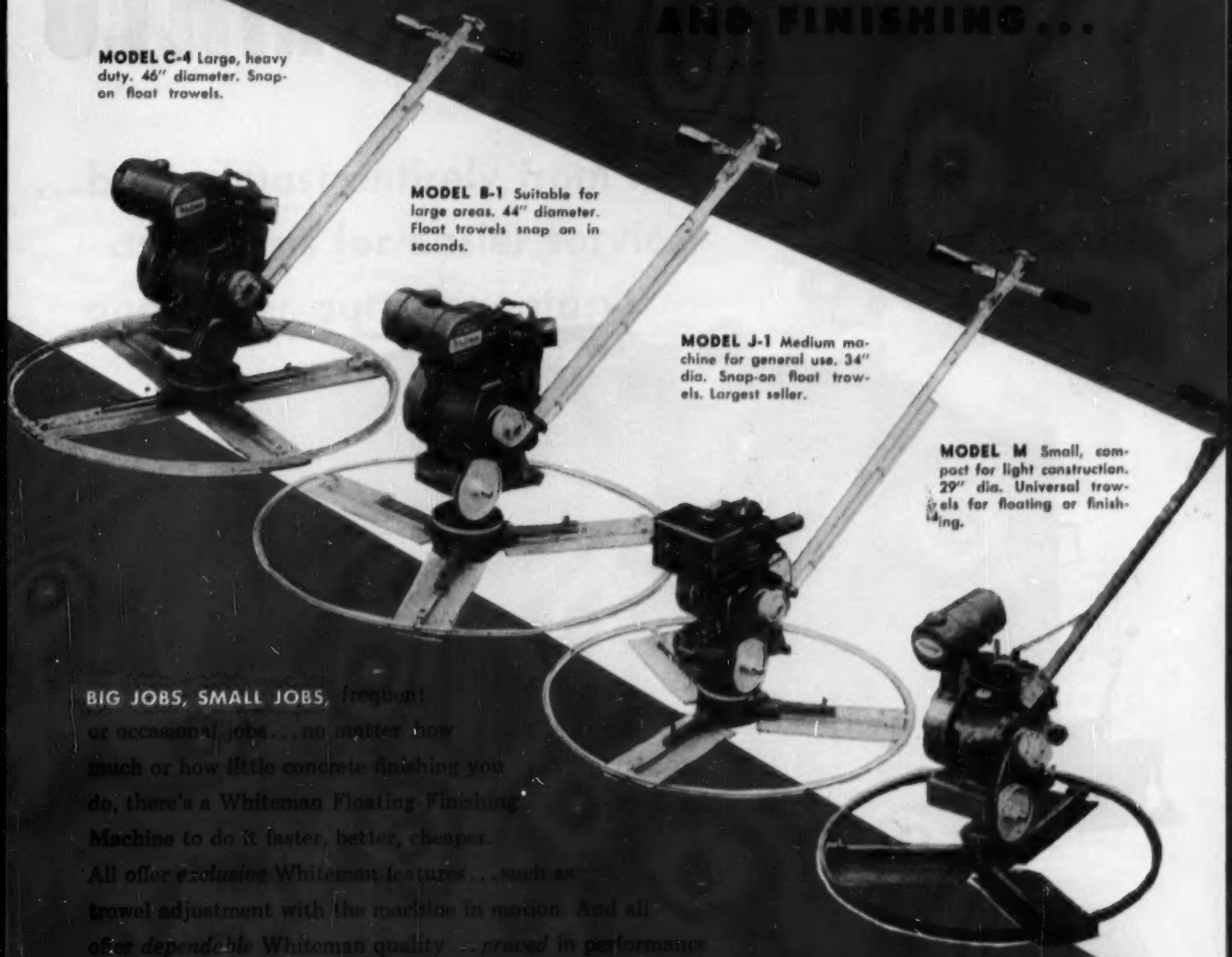
A Handy Helper On Concrete Jobs

Mix and place concrete at a rate faster than you figured and you've got a profit you never expected. If you do concrete work, you will find CM&E's new booklet, Concrete Mixing and Placing, an invaluable help. It consists of a series of 13 articles written by specialists for CM&E and reprinted in booklet form for your convenience. It contains a wealth of information on the latest, money - saving techniques for all types of concrete work. Single copies cost only 50¢; for orders of 10 copies or more, the price is 40¢ each. Address your order to: Editor, Construction Methods and Equipment, 330 W. 42nd St., New York 36, N.Y.

THERE'S A Whiteman MODEL FOR

EVERY SIZE JOB!

OF CONCRETE FLOATING AND FINISHING...



MODEL C-4 Large, heavy duty. 46" diameter. Snap-on float trowels.

MODEL B-1 Suitable for large areas. 44" diameter. Float trowels snap on in seconds.

MODEL J-1 Medium machine for general use. 34" dia. Snap-on float trowels. Largest seller.

MODEL M Small, compact for light construction. 29" dia. Universal trowels for floating or finishing.

BIG JOBS, SMALL JOBS, frequent or occasional jobs... no matter how much or how little concrete finishing you do, there's a Whiteman Floating-Finishing Machine to do it faster, better, cheaper. All offer *exclusive* Whiteman features... such as trowel adjustment with the machine in motion. And all offer *dependable* Whiteman quality ... *proved* in performance during 17 years of pioneering and development. Ask your Whiteman distributor which machine will best serve your needs.

Whiteman

THE LEADER IN CONCRETE EQUIPMENT

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3249 Casitas Ave., Dept. C
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Please send information on:

☐ Floating-Finishing Machines ☐ Vibrators
☐ Power Buggies ☐ Screeding Machines

Name _____

Firm _____

Address _____

City _____ Zone ____ State _____

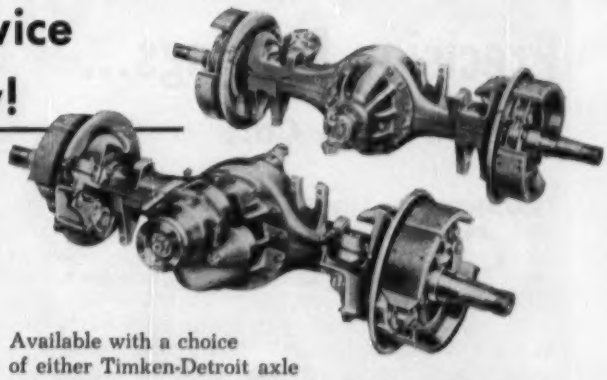
New TDA® lightweight

7,500 EXTRA TON-MILES

highway tandem gives

PAYLOAD A YEAR*

...built almost entirely from interchangeable standard axle parts for easier service and lower parts inventory!



This new lightweight tandem brings two important new advantages to construction truckers – greater payload capacity† and much easier maintenance.

More than two hundred pounds lighter than any other unit of the same capacity, this new TDA tandem will save a trucker 7,500 deadweight ton-miles during an average 75,000 mile year. This means more payload and profit where it counts.

Almost all of the parts – gears, pinions, differentials and brakes – used in this new tandem are interchangeable with parts from Timken-Detroit® standard single axles. This assures operators less down time . . . faster, simpler, more economical service . . . and smaller replacement parts inventory.

Available with a choice of either Timken-Detroit axle connecting groups, or brackets to accept other approved chassis hook-up parts. Plus these additional advantages with the Timken® lightweight tandem:

TDA Inter-Axle Differential Divides Torque Evenly Between Axles . . . and yet permits wheels of one axle to revolve faster or slower than wheels of the other axle. This means both axles are always doing equal amounts of work . . . driving parts and tires last longer.

Driver-Controlled Lockout – with TDA inter-axle differential, the driver can obtain the advantages of straight-through drive under slick or icy conditions by locking out the differential at *any* driving speed.

Big, Dependable Hypoid Gears rotate in conventional direction for maximum gear and bearing life.

This new highway tandem insures new payload profits, faster, easier service and operating economies for construction truckers everywhere. For complete information contact your nearest vehicle dealer or branch.

*based on 75,000 highway miles a year.
†for the same gross vehicle weight.

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN
The Accepted TDA Standard
TRADE MARK REGISTERED

World's Largest Manufacturer of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York Ashtabula, Kenton and Newark, Ohio • New Castle, Pennsylvania

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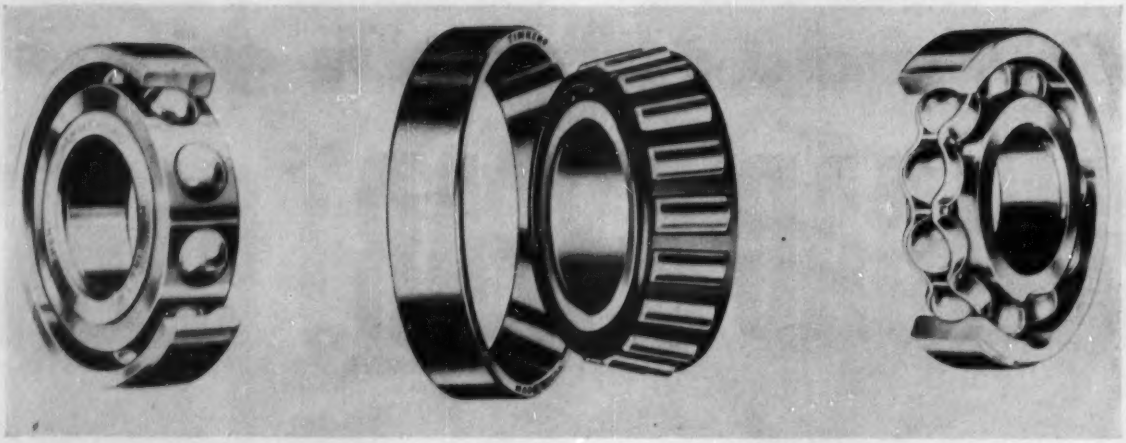


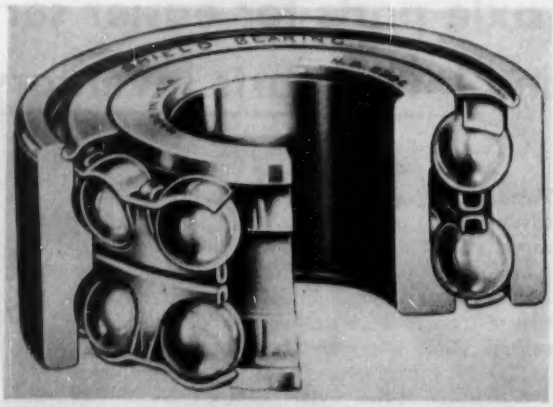
PRECISION BEARINGS fall into two main groups—ball-type and roller-type. Made by a number of reputable manufacturers, all of them offer the same good maintenance advice. Handle with care if you want to avoid early failures.

Precision Bearings...

Handle with Care

PRECISION BEARINGS are just what the name implies. They are precision built for a precision job. If they are improperly installed or removed, inadequately lubricated, or accidentally damaged, you are asking for early and serious trouble.

To help avoid damage to these vital parts, the Euclid Division of General Motors offers these tips when overhauling or repairing precision bearings in the field or in the maintenance shop.



BEARINGS, such as this double-row shielded are made with the same precision as a fine watch. They'll do a good and rugged job for you as long as you treat them with respect.

Bearing Maintenance

1. Never remove a bearing from an assembly unless it is absolutely necessary.

2. Work in a clean area with clean hands and tools. This is most important if bearings must be removed or installed outside the shop.

3. Use the correct type bearing puller when a bearing is being removed. If a bearing must be removed and no puller is available, employ a soft drift and hammer. Tap against the bearing's outer race if the bearing is installed in a housing; tap against the inner race if the bearing is installed on a shaft.

CAUTION: Should the bearing happen to be staked in place, the staking must be removed before pulling the bearing.

4. Old or used bearings should be washed in a suitable solvent, such as high grade kerosene or Oakite, following removal and then dried with filtered compressed air. Never wash a bearing with water or steam, nor attempt to dry it by spinning at high speed.

5. Carefully inspect bearings as follows:

a) check for excessively hardened areas . . . indicated by streaks or spots.
b) check for cracks, etching, or excessive wear and roughness.
c) note any evidence of overheating . . . indicated by discoloration.

6. If inspection shows bearings are fit for continued service, they should first be washed in a 5% solution of soluble oil (190° to 200° F), thoroughly dried, and then dipped in the recommended operating oil or packed with grease.

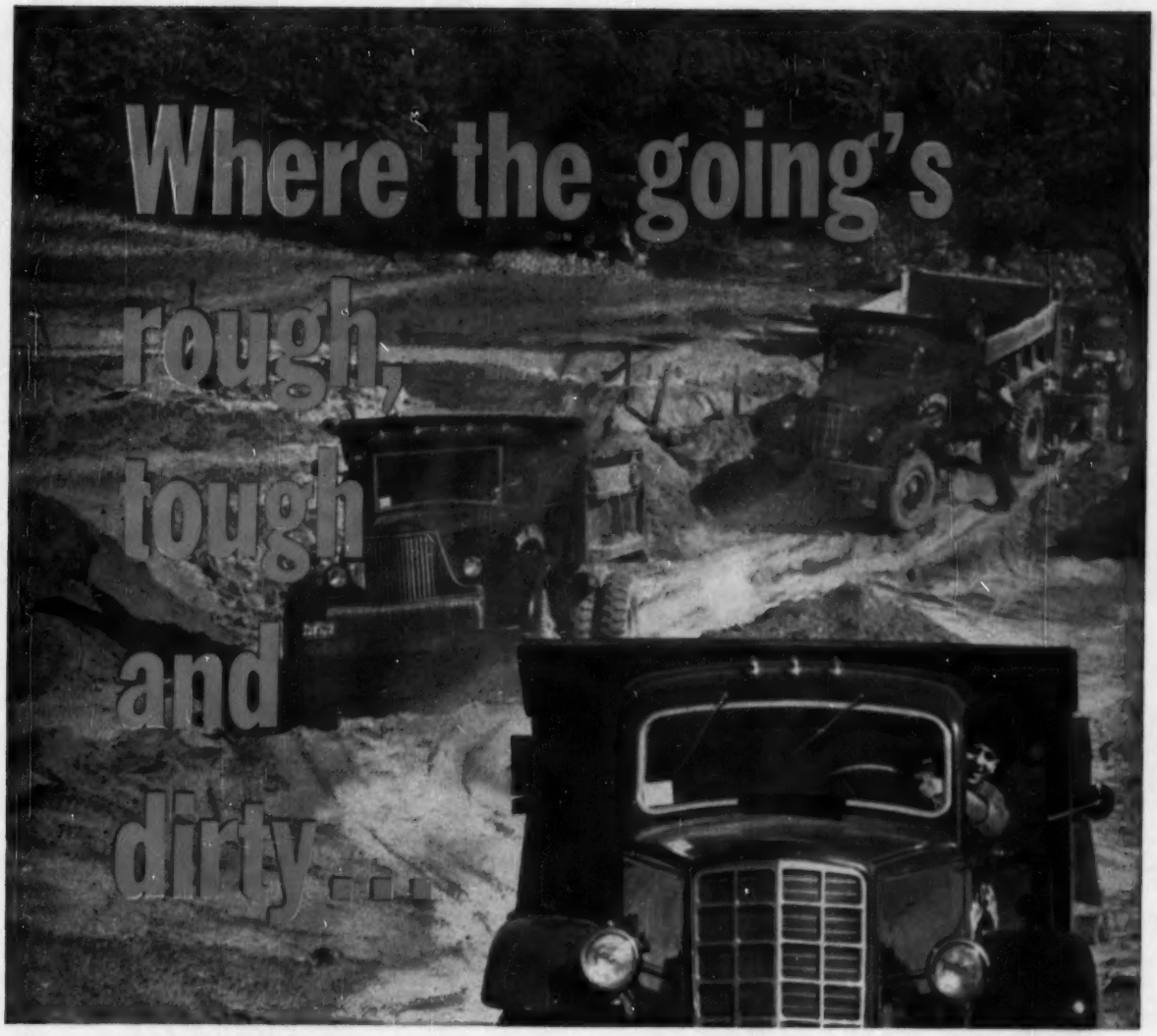
NOTE: If bearings are to be stored, wrap them carefully in oiled paper and place in a clean, dry location.

7. When re-installing a bearing, an arbor press and pipe sleeve are recommended tools. Once the bearing is in place, double check to be sure it is seated properly. If the bearing must be heated in an oil bath to facilitate installation, the bearing should be repacked with grease *after* being installed.

New Bearings

In case it is determined that a new bearing is required in a particular application, do not attempt to wash the new bearing before installation, unless it has become dirty. All new bearings, as packed and wrapped by their manufacturers, are ready for im-

(Continued on page 123)



FRAM is first!

HERE'S PROOF . . . In a recent survey among thousands of construction men—contractors, builders, engineers—respondents were asked to state what brands of equipment they preferred. The results of that survey, as far as oil filters go, are recorded in the chart below. It shows how FRAM is the overwhelming choice among the 3 leading filter brands. We think this speaks for itself!

FRAM
OIL • AIR • FUEL • WATER
FILTERS

BRAND	1ST CHOICE	MENTIONED
FRAM	36.4%	49.2%
"A"	13.9%	26.5%
"B"	12.1%	26.5%

FRAM CORPORATION, Providence 16, R.I. Fram Canada Ltd., Stratford, Ontario

Why Contractors Choose

ARMCO CORRUGATED METAL DRAINAGE STRUCTURES

A four-man crew completed this stream enclosure in 3½ days. The structure will replace obsolete bridge shown in background.

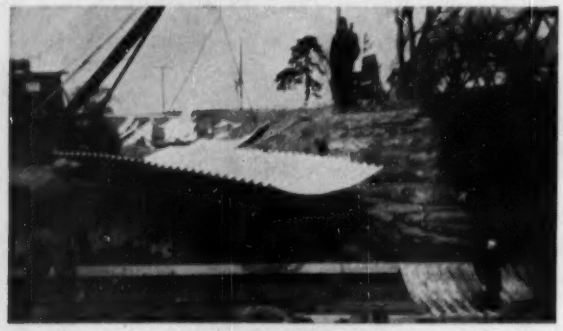
Earth fill and a 144-inch Armco MULTI-PLATE Pipe under 46 feet of cover carries a road across a wide gulley and small stream. The estimated saving over an alternate bridge structure was approximately $200,000.

A small crew assembled this MULTI-PLATE Pipe-Arch alongside the streambed. It was then moved into position and backfilled immediately. The road was closed only 5 hours.

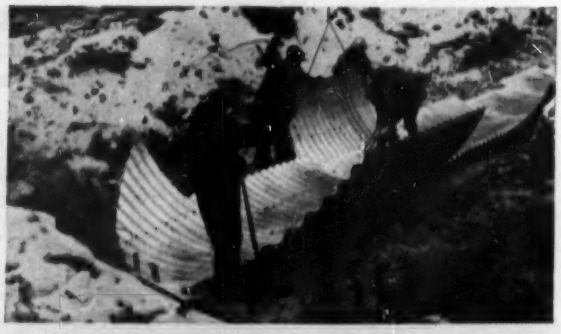
Naturally you are interested in low bids with adequate profit. This is why so many contractors choose Armco Corrugated Metal Drainage Structures. They require no costly formwork and no delay for curing. You can finish the job quickly, even with a small, unskilled crew and no special equipment—allowing your men and equipment to move on to the next job.

Long lengths of standard corrugated pipe and simple bolted couplers mean fewer joints, faster installation. Light weight makes for easy handling and hauling. For larger Armco MULTI-PLATE Structures curved, corrugated plates are quickly assembled on the job-site.

Write for more data on Armco Drainage Structures. Armco Drainage & Metal Products, Inc., 3306 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.



A simple truck-mounted hoist was used to lift and position all the sections of this MULTI-PLATE stream enclosure. "Knocked-down" plates are easily handled with light equipment.



Sub-freezing weather did not halt construction because Armco Drainage Structures can be installed under adverse weather and foundation conditions.

ARMCO DRAINAGE STRUCTURES

ARMCO®

PRECISION BEARINGS...

continued from page 120

mediate use. Simply break the seal on the wrapping, remove the oiled paper, and install the bearing.

Lubrication

Adequate bearing lubrication is necessary to (a) reduce sliding friction, (b) prevent seizure, (c) carry away heat and (d) seal the bearing to protect it against dirt.

It is mandatory that the correct grade, type and amount of lubricant be applied to precision bearings, and that the recommended lubrication intervals be closely followed. All required data can be found when needed in the maintenance manuals and lubrication charts for the particular equipment.

Overfilling or overpacking of precision bearings may cause overheating during operation, resulting in premature bearing failure. When packing a bearing with grease, 1/3 to ½ of bearing capacity is the proper quantity to apply.

Shop on Wheels Saves Downtime

ROY L. HOUCK, who believes maintenance facilities should be as mobile as an earthmoving fleet, credits his on-the-job repair shop and well-organized preventive maintenance program with keeping his equipment continuously productive.

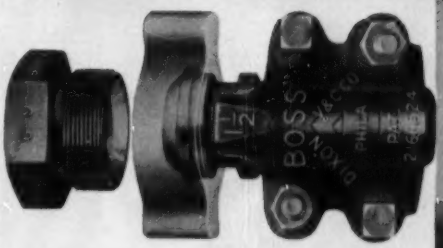
Houck, president of Roy L. Houck & Sons of Salem, Ore., fitted out a variety of service trucks and semi-trailers to follow his equipment wherever it works. This maintenance set-up prevented any major break-downs to five C Tournapulls he used on a highway job at Brooks, Ore., where he handled more than 1,200,000 yd of silty clay and mud.

Houck worked his Tournapulls on a rotation basis so that four were running at all times and the fifth was in the pit for a check-up. The sidelined machine was serviced by mobile maintenance equipment, including a parts trailer, grease truck, materials trailer, boom trailer, mechanics' truck, and portable steam cleaner.

The initial outlay for this set-up was large, Houck admits, but he says it is paying for itself by cutting downtime to a minimum and by eliminating large, costly repair jobs. He intends to add to his facilities so that any service problem can be handled right on the job.

Safest Connections for Pile Driver Hose

AND OTHER STEAM, AIR, WATER AND HYDRAULIC APPLICATIONS



"GJ-BOSS"

GROUND-JOINT FEMALE COUPLING, STYLE X-34

The original *washerless* coupling that is unequalled for *safety* in every high pressure service, and will therefore serve with exceptional efficiency and economy on all low-pressure applications. Built to withstand hard use and rough handling. Ground-joint union between stem and spud provides leak-proof, trouble-free seal . . . no lost or worn-out washers to replace. All parts malleable iron or steel, thoroughly rustproofed. Furnished with super-strong "Boss" Offset and Interlocking Clamps. Sizes ¼" to 6", inclusive.

COMPANION MALE COUPLING "BOSS", STYLE MX-16 . . .

Designed as the companion coupling for the "GJ-Boss" described above, and the "Boss" Washer Type Coupling Style W-16, this male fitting will prove equally efficient and economical for all applications in which standard iron pipe nipples are normally used. Each size fits same size hose . . . oversize hose is not required. Used for the same wide range of services as the "GJ-BOSS", and for high or low pressures. Coupling consists of I. P. T. male stem and "Boss" Offset and Interlocking Clamp. Steel or malleable iron, thoroughly rustproofed. Sizes ¼" to 6", inclusive.

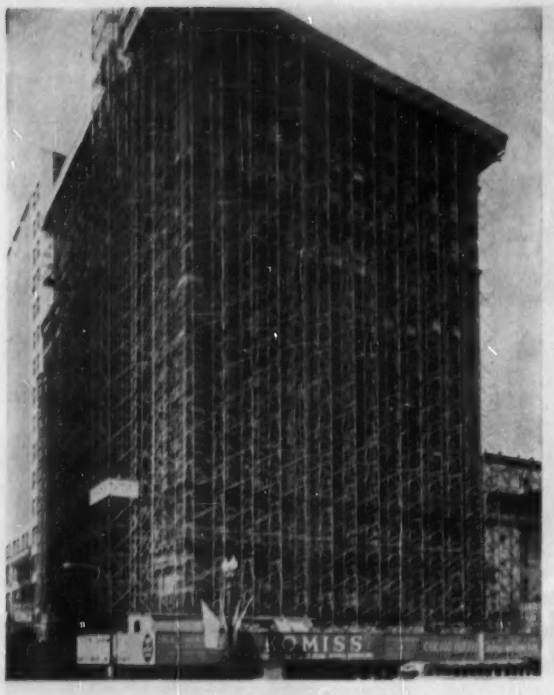
Stocked by Manufacturers and Distributors of Mechanical Rubber Goods

DIXON Valve & Coupling Co.

GENERAL OFFICES & FACTORY - PHILADELPHIA 22, PA. BRANCHES—CHICAGO BIRMINGHAM • LOS ANGELES • HOUSTON • DIXON VALVE & COUPLING CO., LTD., TORONTO

ASSOCIATE COMPANIES - BUCK IRON COMPANY, INC., QUARRYVILLE, PA. - PRECISION DRAWN STEEL COMPANY, CAMDEN, N. J.

(Advertisement)



For safety and savings on large jobs or small, you should know . . .

How to Select Scaffolding and Shoring

MANY CONTRACTORS must be confused about conflicting claims regarding scaffolding purchase and rental values—and for good reason. They see a wide range of prices for what looks like the same thing. "Why not buy the cheaper stuff," they ask, "and pocket the difference." Facts show that the scaffolding with the lower price may actually cost much more than the equipment with the higher original price. The right way to select scaffolding and shoring is to consider all these points:

Lower Output—Workmen move more slowly on scaffolding that is shaky or looks unsafe. Erection and disassembly frequently take longer too, when joints and components are not precision-built to fit perfectly.

Accidents—Even minor accidents due to scaffolding defects can cost more in work stoppage and injury claims than the entire cost of the scaffolding itself. It doesn't pay to pinch pennies when it can cost dollars and even lives.

The Manufacturer—Deal with an established scaffolding manufacturer whose equipment over the years has earned a reputation for safety and dependability. His long list of satisfied, safety-conscious customers is also a good indication of the quality of scaffolding he sells.

Other Benefits—Most jobs lend themselves to one type of scaffolding better than to any other type. The Patent Scaffolding Co., with the only really complete line of equipment, can recommend the type best suited to the project at hand. Through its nationwide network of branch warehouses and representatives, PS Co. can help meet emergencies by quickly shipping the right type of scaffolding. For those who prefer to rent scaffolding rather than buy it, completely reconditioned equipment—ready to be used without further maintenance—is always available through PS Co. offices.

To help you with your scaffolding and concrete shoring methods, PS offers a complete nation-wide engineering service available to you locally. See the Yellow Pages in your 'phone directory for the nearest Patent Scaffolding office or representative that sells and rents "Gold Medal" Scaffolds.

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

THE PATENT SCAFFOLDING CO., Inc.

38-21 12th Street Dept. CM&E, Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.
Branches in all principal cities
In Canada: 355 Dufferin St., Toronto

Make Yours an Austin-Western in '56

BUILT TO OUTPERFORM

The unequalled performance standard of each Austin-Western product is the result of advanced engineering skill teamed with years of manufacturing know-how.

To be sure —
There is no substitute for Austin-Western quality.
There is no substitute for
Austin-Western performance.

Model "40" Motor Sweeper

Tandem Roller

Truck-Mounted Hydraulic Crane

Self-Propelled Hydraulic Crane

4x4 Power Graders (88-L and 99-L)

6x6 Power Graders (Super 88 and Super 99)

3-Wheeled Roller

Austin-Western

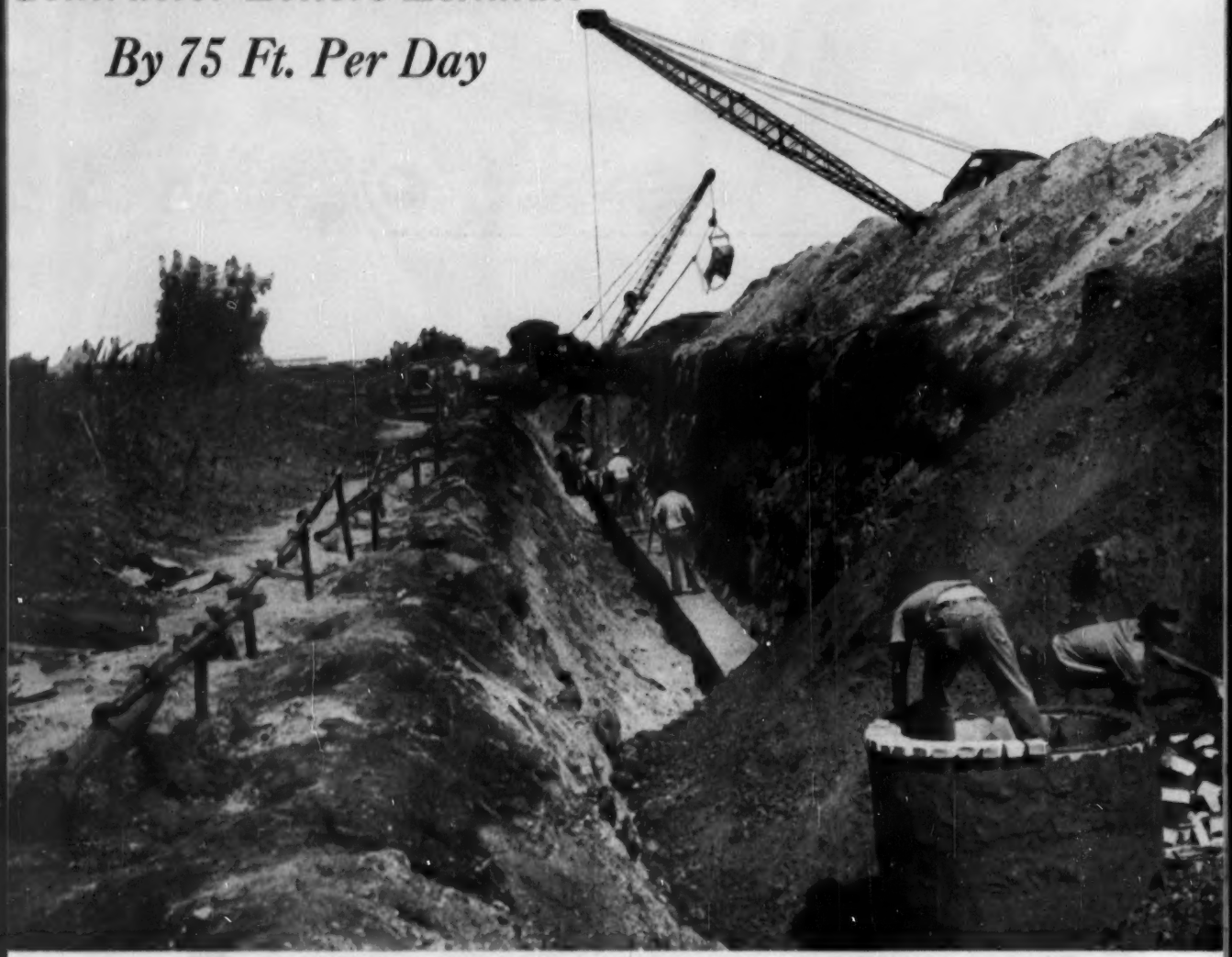
Power Graders · Motor Sweepers
Road Rollers · Hydraulic Cranes

BALDWIN BLH LIMA-HAMILTON
Construction Equipment Division

Manufactured by
AUSTIN-WESTERN
CONSTRUCTION EQUIPMENT DIVISION
Baldwin-Lima-Hamilton Corporation
AURORA, ILLINOIS, U.S.A.

PROGRESS NEARLY DOUBLED!

Contractor Betters Estimate By 75 Ft. Per Day



15" Interceptor Sewer encased in concrete — Rockford, Illinois

M. M. Sornsin Const. Co., Rockford, bid this sewer estimating progress at 100' per day. Moretrench Wellpoints, keeping 8' of water out of sight, speeded things up considerably.

To date, they have been averaging 175' per day of pipe layed, concreted, backfilled — and wellpoints move ahead!

Another clear-cut proof that a dry job moves *fast... saves time and money.*

Contact us now for an estimate on how to handle your wet work profitably.

MORETRENCH CORPORATION

90 West St. New York 6 | 4900 S. Austin Ave. Chicago 38, Illinois | 7701 Interbay Blvd. Tampa 9, Florida | 315 W. 25th St. Houston 8, Texas | Rockaway New Jersey

Western Representative: Andrews Machinery of Washington, Inc., Seattle 4, Washington

Canadian Representative: Geo. W. CROTHERS Limited, Toronto, Ontario

UNUSUALLY SHAPED bulldozer blade was called into service on Chicago's $150 million Congress Street Expressway to move stable yellow clay fill over a strata of unstable blue clay below the highway's subgrade after scrapers mired in the sticky stuff.

U-Shape Dozer Blade Solves Clay Problem

U-SHAPED BULLDOZER BLADES are saving contractors time and money in construction of Chicago's $150 million Congress Street Expressway.

Contractors brought Caterpillar's U8 blade to the 24-mi highway to move stable yellow-clay fill over an unexpected 4-ft strata of blue clay just below the surface. Graders and scrapers had mired in the sticky blue clay. What was needed was a versatile piece of equipment which could do the job of both scrapers and graders without miring.

Mounting U8 on Cat's D8 tractor gave them the equipment they needed. The blade's unusual shape enables the bulldozer to haul up to 15-cu yd loads distances of 400 ft without loss of material. It also spreads, rough grades, and partially compacts the material.

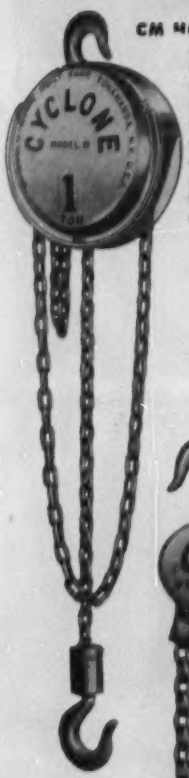
"It is the only piece of equipment that can do this job economically," said P. W. Joy, general superintendent for the Thomas McQueen Co., one of the 10 contractors working on the eight-lane highway.

When Illinois state engineers decided the blue clay would have to go, they considered replacing it with stone. That idea died for one important reason: it would cost $2 million. *(Continued on next page)*

SNAPPING OPEN of dragline in mid air causes the yellow clay to fracture when it drops on to the highway paving area. This makes it easier to move and permits compacting it in 6-in. layers.

WHY BUY LESS

...the best costs so little



CM HOISTS AND PULLERS are ruggedly constructed to give you years of trouble-free service. Yet they are unusually light...easy to handle because they are constructed of the strongest alloys of steel and aluminum. Equipped with famous CM-Alloy flexible, welded alloy steel load chain.

CM CYCLONE

- Capacities from ½ to 10 ton.
- 1-ton model weighs only 36 pounds.
- 96% efficient—easy to operate.
- Lifetime lubricated.

CM PULLER

- Capacities ¾, 1½, 3 and 6 ton.
- ¾-ton model weighs only 13 lbs.
- Lifts or pulls at any angle.
- Lifetime lubricated.

Write for catalog and name of your nearest CM dealer.

CM

CHISHOLM-MOORE HOIST DIVISION
COLUMBUS McKINNON CHAIN CORPORATION
TONAWANDA, NEW YORK
REGIONAL OFFICES: NEW YORK, CHICAGO, CLEVELAND
In Canada: McKinnon Columbus Chain Limited, St. Catharines, Ont.

U-SHAPED DOZER BLADE . . . continued from page 127

STEEL SIDE WALLS enable curved blade to move 15-cu-yd loads distances of 400 ft. without loss of material. Dozer also spreads, rough grades, and partially compacts clay.

A large quantity of yellow clay was available at higher grades. Engineers decided to remove about 2 ft of the blue and replace it with the yellow which has far better compaction qualities. They estimated that 2 ft of yellow clay fill over the blue clay would carry the paving load.

McQueen built a 400-ft long test area. He mounted draglines on brick bats and removed 2 ft of the blue clay, then draglined the yellow clay and dumped it on to the paving area. He used draglines because snapping the bucket open in mid air fractured the clay as it fell to the ground, making it easier to handle.

The dozer distributed the fill in 6-in. layers. A few passes over the layers, followed by sheepsfoot rollers, compacted the clay. This operation was repeated until the full 2-ft clay substitute was placed. The originally specified 6-in. layer of Grade 8 stone followed, and a test was taken.

The sample area reached up to 90% of compaction. So state engineers ordered the method used throughout the job. Necessary contract adjustments followed, and all 10 contractors put U8 blades to work wherever the clay problem presented itself. They use standard scrapers and graders where no clay problem exists.

U8 is mounted and operated the same as conventional blades. Its difference lies in three steel plates welded together to form a rough U-shape which enables it to carry larger loads. Steel walls on its ends prevent the loss of material in transit.

The blade has an over-all length of 11 ft 11 in. and stands 2 ft 9 in. high. It has a maximum lift above ground of 4 ft 6 in. and features an angle-tilting adjustment of 1 ft 4 in. Pitch adjustment is 10 deg.

Other contractors using it are J. M. Corbett Co., M. J. Boyle and Co., W. J. Sheppard and Co., Thomas M. Madden Co., Robert R. Anderson Co., Hedges Construction Co., and Fenzel Brothers Co., all of Chicago. Also, Arcole-Midwest Corp. and Contracting and Material Co., both of Evanston.

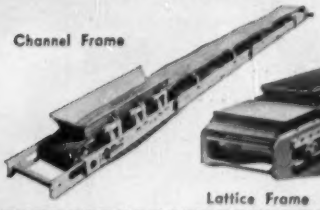
When completed, the new highway will provide a link between Chicago's east and west suburbs.

Whatever your material-moving job

A Universal radial stacker installation for stockpiling.

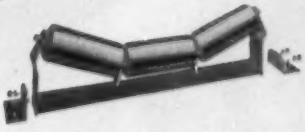
Two types of frame construction to choose from:

Channel Frame



Lattice Frame

Triple troughing roll with self cleaning mounting and self aligning, sealed for life bearings



Universal Portable Conveyor with hydraulic hoist

there's a UNIVERSAL CONVEYOR

that does it for less

Sectionalized construction and simple, flexible design are the main reasons for Universal Conveyors' low cost and versatility. Head sections, intermediate sections in many lengths, and tail sections are combined with Universal's complete line of conveyor accessories to handle any job efficiently and economically. Simple design makes it easy to set up, move, or alter your Universal Conveyor for different jobs.

Universal offers these quality features assuring you extra years of use and low cost maintenance.

- Anti-friction, sealed for life, or grease-type bearings
- Self cleaning mountings and tail pulleys
- Adjustable belt flashings
- Screw or Gravity type take up to maintain belt tension
- Lagged drive pulley
- Extra heavy cold rolled shafts

Send for free literature. For greater savings, ask for information on Universal's assemble-yourself Pre-Fab Conveyors.

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

Whatever your material moving requirements, there's a Universal Conveyor to do the job profitably. And Universal's complete engineering services are available to design your installation.

UNIVERSAL ENGINEERING CORPORATION
327 - 8th St., NW, Cedar Rapids, Iowa

Gentlemen: Please send me information on —

☐ Universal Conveyors ☐ Universal Pre-Fab Conveyors
☐ Radial Stackers ☐ Conveyor Engineering Service ☐ Conveyor Idlers

Your Name

Company Name

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City State

ANNOUNCING THE POWERFUL

BIG NEW BAY CITY

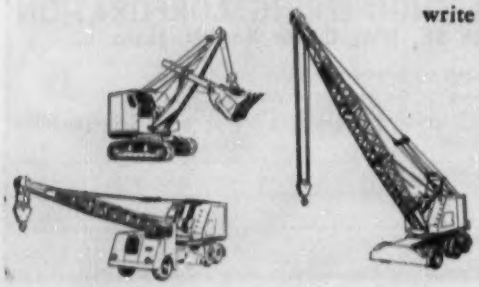
HEAVY DUTY ONE YARDER!

BECAUSE of its great power and great strength and well-balanced weight, the brand new BAY CITY one yarder can really increase the speed and increase the range of your digging or materials-handling operations. The greater power (113.5 HP) supplied by the Diesel engine assures a smooth digging cycle. The bigger lifting capacity (42,000 lbs. at ten feet radius with a 40 foot boom) brings you greater work capacity. And the well-balanced weight (53,410 lbs. to 59,450 lbs.) gives you added stability to stand up under constant heavy duty service. This big new BAY CITY machine converts from a crane to a hoe, a dragline, or a shovel. As a hoe with a one-yard dipper, it reaches out 34'-3" at ground level, and digs to a depth of 23'-3". As a dragline, it produces a cable speed of 154 fpm and a cable pull of 20,000 lbs. As a crane, of course, it does a great job whether with hook, or clamshell.

For further information on this brand new, heavy duty 1-yd. BAY CITY, write for Bulletin 60-A.

BAY CITY Heavy Duty One-Yard Specifications:

- Power: Diesel, 113.5 HP
- Capacity: 21 Tons
- Weight as hoe: approx. 59,450
- Weight as crane: approx. 53,410
- Brake: wide band type
- Crawler shoes: 30" or 34"
- Bases: unit cast alloy steel
- Drums: tandem
- Swingers: shoe type
- Convertible



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BAY CITY SHOVELS INC. • BAY CITY, MICHIGAN

BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

A Check List of...

Insurance for the Contractor

I. EMPLOYEE INSURANCE

A. Workmen's Compensation Insurance

Provides coverage for benefits to injured employees as specified by Workmen's Compensation laws. Differs in rate and scope from state to state.

1. **"All States" Endorsement**
   Provides coverage under the laws of other states when an employee hired in the state of the contractor's principal operations is temporarily working in another state.
2. **Out-of-State Workmen's Compensation**
   Although policy may carry the "all states" endorsement, it is necessary to specifically cover the law of any state in which the contractor hires employees.

NOTE: If employees work as crews on vessels check coverages necessary under the Jones Act and the protection needed under the Admiralty courts. Harbor workers while on vessels come under the U. S. Longshoremen's and Harbor Workers' Compensation Act. State Compensation laws cover workers on land abutting navigable waters.

II. JOB AND PROPERTY INSURANCE

A. Builders' Risk Fire Insurance

Insures projects under construction against direct loss or damage by fire or lightning. Includes destruction by civil authorities to prevent further advance of fire.

1. **Reporting Form Builder's Risk**
   Requires contractor to notify insurance company of increased values of work performed each month. Premium increases as job progresses. Best form for jobs lasting longer than two years.
2. **Completed Value Form Builder's Risk**
   Requires purchase of full amount of insurance at time policy is issued, but premiums are only 55% of the Reporting Form rate. Best for short term jobs.

B. Extended Coverage Endorsement to Builder's Risk Fire Insurance

1. **A very important addition** to fire insurance that covers the hazards of windstorm, hail, explosion other than boiler, riot, civil commotion, aircraft, smoke, and vehicles. It is also possible to purchase insurance against any one of these risks separately.
2. **Earthquake insurance**
   Not included in the extended coverage endorsement. Must be purchased separately.
3. **Vandalism and malicious mischief insurance.**
   Not included in the extended coverage endorsement. Must be purchased separately.
4. **Water Damage Insurance**
   Can be purchased as endorsement to the extended coverage endorsement. Does not cover sprinkler damage.

C. Installation Floater Policy

Broad all-risk coverage for materials to be used on a project while being transported and installed. Caution: Policy usually contains 30-day limitation clause applying to materials stored on the site.

D. Contractor's Equipment Floater (Broad Form)

Insures equipment not designed for highway use against almost all risks regardless of where located and while being transported. By bulking all equipment under one policy, more attractive price can be obtained. It is also possible to purchase insurance for named perils such as fire, theft, etc.
NOTE: Three-year policies can result in substantial premium savings.

E. Fire Insurance on Own Buildings

Basic fire policy should be endorsed to include the Extended Coverage endorsement against wind, riot, smoke, etc.

F. Money and Securities Insurance (Broad Form)

Covers within and/or away from premises against loss of money and/or securities from disappearance, destruction, or wrongful abstraction, except losses due to dishonesty of own employees, war, or forgery.

G. Named Peril Money and Securities Insurance

If contractor is content with named peril coverage, he can purchase many types of policies designed to protect him against loss due to specific risks.

H. Paymaster Robbery

Protects money or checks to be used for payrolls only. Can be purchased on broad or narrow form. Broad form covers disappearance and wrongful abstraction as well as actual destruction of such funds. Narrow form, or "holdup" form, covers only theft, burglary and robbery. Neither policy covers employee dishonesty, forgery, war, or unattended money.

I. Fidelity Insurance

Bonds contractor's employees who handle money or materials. Protects contractor against losses due to embezzlement or wrongful abstraction of money and property. Coverage can be purchased on a blanket basis, covering all employees, or on a "named-employee" or "named-position" basis.

J. Forgery Insurance

Valuable because most large fidelity losses involve forgery. Besides reimbursing contractor in event of such loss, policy provides for legal representation during legal actions covered by policy.

K. Valuable Papers Insurance

Protects insured against loss, damage or destruction of valuable papers such as books, records, plans, etc. Does not cover loss by mysterious dis-

INSURANCE CHECK LIST
continued

appearance, or by wear and tear, deterioration, vermin, or war.

III. CONTRACTOR'S LIABILITY

A. Comprehensive General Liability

Provides protection for contractor's legal liability for bodily injury or property damage to persons not his employees arising out of the operations of the contractor or a subcontractor engaged by him. Also provides liability coverage for contractor's equipment except that which is licensed to operate over public streets.

1. **Contractual Liability Insurance**
   The comprehensive policy covers only that liability which is legally the contractor's. Contractual Liability protects him against "hold harmless" clauses and other liability he assumes through contract.
2. **Completed Operations Insurance**
   Covers liability for bodily injury or property damage to third persons that occurs after the contractor has completed his job.

NOTE: There are exceptions to the coverage provided by the Comprehensive General Liability policy. Special endorsements may sometimes be purchased. Some of the most prominent exclusions are as follows:

1. Structural damage or collapse of buildings or structures due to demolition, explosion or blasting, shoring or underpinning.
2. Damage to underground wires, pipes, or other public utilities due to excavation or drilling.
3. Damage to property in the care, custody or control of the contractor.

IV. VEHICLE INSURANCE

A. Liability Coverages (bodily injury, property damage and medical payments)

1. **Owned Vehicles**
   Graded premium scale is applicable when more than five vehicles are insured under the same policy.
2. **Hired Cars**
   Contingent liability coverage for all other vehicles rented or borrowed by the contractor.
3. **Employer's Non-Owned Cars**
   Contingent coverage for liability that may be imposed on the contractor because of employees using their own cars on the contractor's business.

B. Physical Damage

1. **Comprehensive Fire and Teft**
2. **Collision**

NOW! CMC TRANSCRETES®
Available in 4 Sizes!

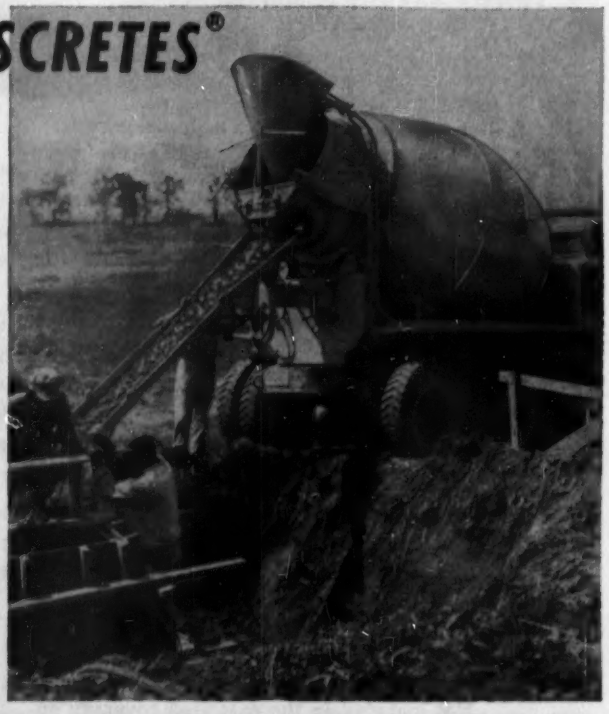
3½ to 7—yard mixing capacities (comparably larger as agitators).

Shorter over-all length for BIGGER LEGAL PAYLOADS.

● The new TRANSCRETES are America's only truck mixers with famous trouble-free CMC FLOATING DRIVE. They are faster charging — have more thorough mixing — quicker discharge on any type, any size job — anywhere.

Write for NEW, FREE Fully Illustrated TRANSCRETE BULLETIN

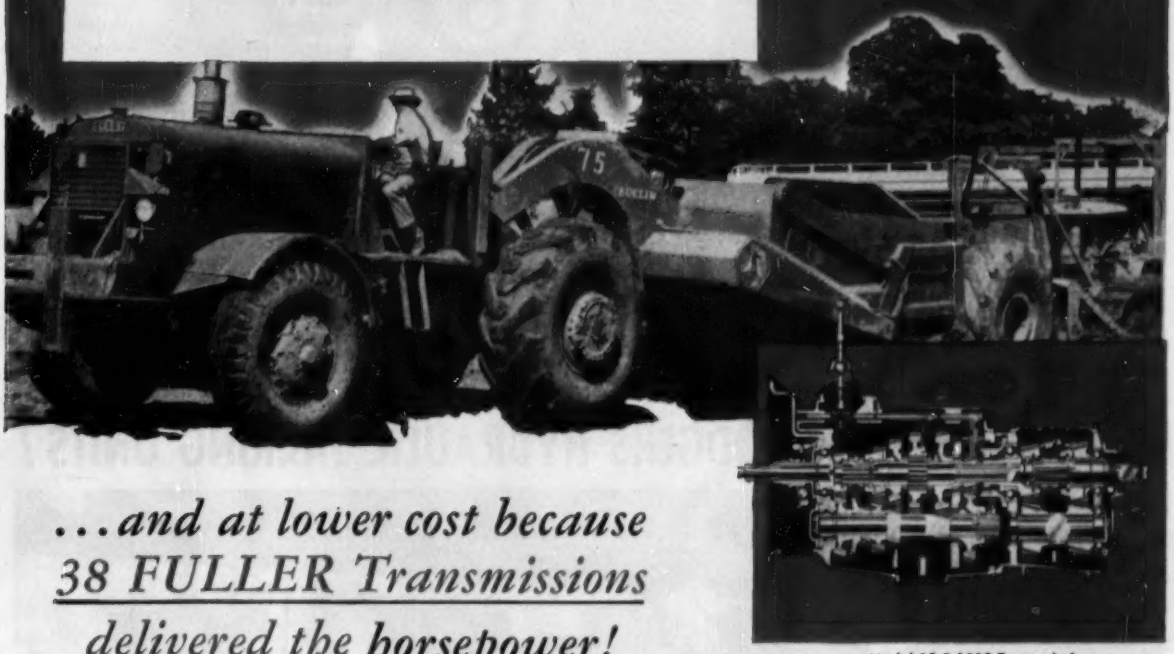
Construction Machinery Co., Waterloo, Iowa



NEW MODEL 700 above, hauls up to 8-plus yard loads, guaranteed to mix any 7-yard batch. 75" drum head, 16° slope for shorter over-all length, more favorable center of gravity, larger legal payloads. CONSTRUCTION MACHINERY CO., Waterloo, Iowa.

This job was done

Quicker, with Less Downtime...



...and at lower cost because 38 FULLER Transmissions delivered the horsepower!

Model 10-F-1220 Transmission

On the three sections of the Ohio Turnpike totaling 12.1 miles near North Royalton, Ohio, for example, the Cook Construction Company of Jackson, Mississippi, used 8 of these 14TDT Euclid Motor Scrapers of 18 yard capacity, equipped with 10-speed Fuller 10-F-1220 Transmissions to speed up the earthmoving. The scrapers are powered by NHS 600 Cummins 275 hp engines.

Cook Construction also used 30 Model 4FDT Euclid Bottom Dumps with Fuller 5-A-920 Transmissions, powered by Cummins NH 200 hp engines, in moving the 6,000,000 yards involved.

Says P. E. Maxsween, Equipment Superintendent: "Whenever I have a choice I *always* specify Fuller Transmissions because I like the way they stand up on the job." Maxsween also likes Fuller Transmissions because they get the job done faster, more efficiently, at less cost and with less downtime.

Cook Construction Company, subcontractor to T. L. James Company of Ruston, Louisiana, on the Ohio Turnpike job, has moved the Fuller Transmission equipped earthmovers to a section of the Kansas Turnpike near Wichita, for which they are prime contractors.

In Kansas, as in Ohio or elsewhere, Fuller Transmissions are putting horsepower to work, efficiently . . . profitably.

Fuller TRANSMISSIONS

FULLER MANUFACTURING COMPANY (Transmission Division), KALAMAZOO, MICHIGAN

Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 6, Cal. and Southwest Dist. Office, Tulsa 3, Okla.

PROBLEM: RAISE A BRIDGE 20 FEET . . .

When this photograph was taken the jacks were suspended (in their supporting blocks) from the bridge deck while the cribbing was raised to the next jacking level.

SOLUTION: RODGERS HYDRAULIC JACKING UNITS!

It isn't often that you have to raise a bridge, but when you do, you'll discover why versatile, powerful Rodgers Hydraulic Jacking Cylinders and Pumps were selected by the Engineering Department, City of Minneapolis, as the safest, quickest and lowest cost method for raising two bridges spanning the Mississippi River. Both structures were raised twenty feet as part of the development of the upper river harbor.

One bridge, consisting of four 200 foot spans and the other, consisting of six 156 foot spans, were raised by lifting one span at a time. To do the job, twenty 50 ton jacking cylinders were placed on cribbing—10 at each end of the span to be raised. An electrically powered hydraulic pump operated the group of ten cylinders at each end. A 13 inch ram travel on the jacks produced completed lifts of an average of 5 feet per 8 hour day, including all cribbing and staying assemblies.

Remote, push button controls permitted the pump operator to go under the bridge where he could watch each lift first hand. The individual pumping source at each end assured absolutely equal lifting force at every jacking point.

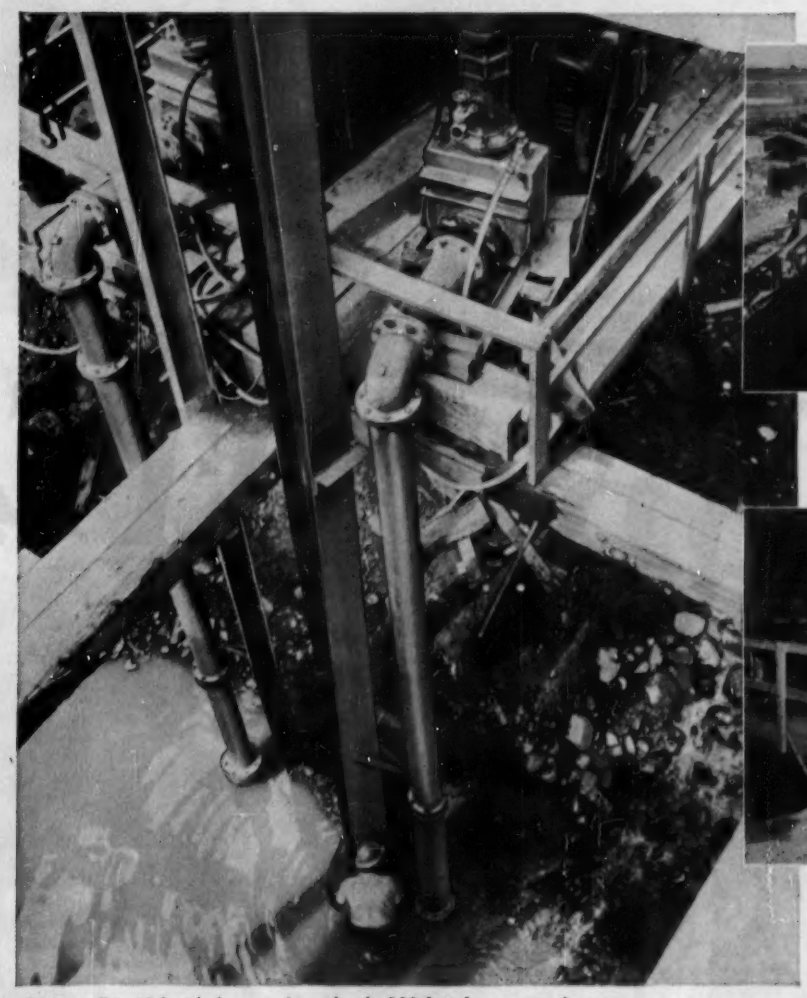
Rodgers Hydraulic Jacking Units with hand or powered pumps can be used wherever needed to PUSH, LIFT or PULL. Available in capacities from 50 to 600 tons with standard ram travels from 6 to 48 inches. Ram travels to 72 inches available on special order. Rodgers engineering department will be glad to assist you in the selection of the exact jacking units required for your particular lifting, pulling or pushing job—large or small.

FREE—Complete report on the jacking phase of the bridge raising job described above—written for you by the engineer-in-charge! Ask for Bulletin 327. You'll also want Rodgers free Bulletin 317A. It contains a complete description of Rodgers Hydraulic jacking units, quick couplers, valves and hoses, and a description of hydraulic equipment used in the construction of tunnel shields.

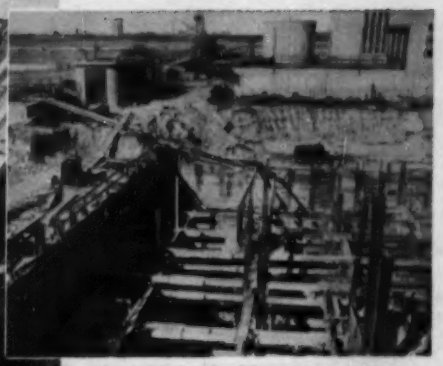
HYDRAULICS Rodgers

Rodgers Hydraulic Inc.

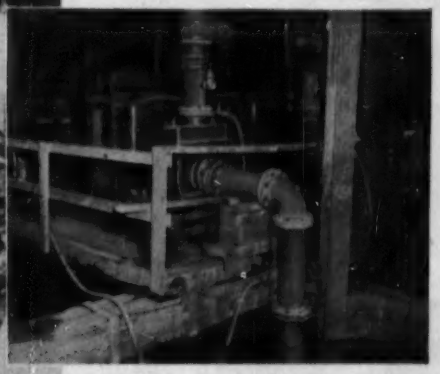
7403 WALKER STREET • MINNEAPOLIS 16, MINN.



Deep well is 65 feet below grade and only 100 feet from water front.



A general view of excavation for new pumping building at Bowery Bay Sewage Disposal Plant. The lift is 24 feet and the discharge is through 250 feet of pipe.



A Tachometer placed on these engines showed 1400 RPM, well below the 1800 RPM maximum recommended by the manufacturer. These Model 8F3 Marlows have an AGC rating of 125,000 GPH.

Contractor Handles Seepage 65 Feet Below Grade

PUMPS WORK STEADILY LESS THAN 100 FEET FROM RIVER

PUMPING IS AN important part of the deep coffer dam work proceeding at the Bowery Bay Sewage Treatment Plant in New York City. At a new pumping building, it was necessary for the contractor, J. Rich Steers, Inc., to excavate 65 feet below grade, in a permeable formation less than 100 feet from Bowery Bay.

A constant stream of seepage is controlled by two Marlow 8-inch pumps operating as a team, each running 12 hours on and 12 off. Throttling valves on the discharge lines regulate the flow so that the pumps operate steadily, rather than pumping and priming alternately.

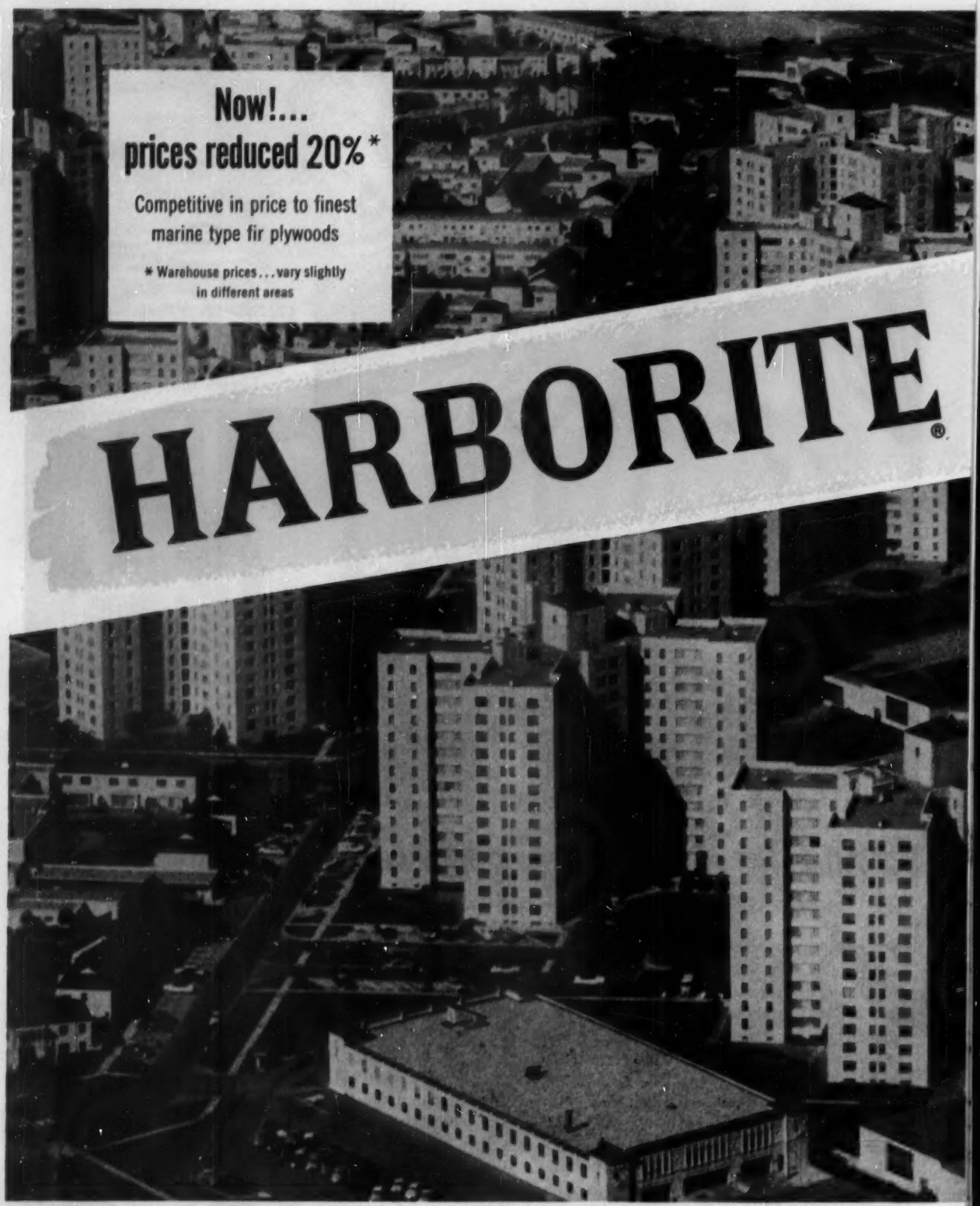
Suction lift on the pumps is 24 feet, but will be reduced to 12 feet as soon as steel is placed and a platform can be built. The present position allows complete freedom for men to work without interference from the pumping equipment.

Pumping started in November 1954 and will continue through 1956. On this $13,000,000 job, there are 11 Marlow pumps, both self-primers and Mud-Hogs. Because of permeable earth, depth of excavation, and water front location, it is essential that the pumps operate dependably.

Need dependable dewatering pumps that will keep your job on schedule — then call your Marlow dealer. Look for his name in your classified phone book, or write for complete information on Marlow pumps . . . and the name of your Marlow dealer.

Marlow PUMPS

MARLOW PUMPS
Division of Bell & Gossett Company
RIDGEWOOD, NEW JERSEY
Morton Grove, Illinois Longview, Texas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miracle concrete form panels may be re-used 125 times!

This overlaid fir plywood...proved lowest cost re-use concrete form material

Harborite is ideal for heavy construction concrete work. Resin-impregnated sheets are permanently bonded to the solid wood core . . . providing a smooth, long-wearing, abrasion-resistant surface that's 100% waterproof. The overlaid faces will not run, bleed or discolor concrete and have a special affinity for oils and other form finishes. High re-use factor (50 re-uses are common, 125 re-uses are not unusual) assures important savings. Available in over-size panels and standard 4'x8' size in any thickness.

Ultimate Number of Re-Uses
Mirror Smooth Surfaces
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Reduced Finishing Costs
Lower Fabrication Costs

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802 North Rome Avenue • Phone 8-1868

Here's the New R-15 "Euc"

that sets a new high in 15-ton Rear-Dump Performance!

DUMPS FAST AND CLEAN

Smooth body interior and tapered rear chute assures clean shedding of the load well back of the rear wheels—an important feature for dumping into hoppers or over the edge of waste banks. Lycoming Silica Sand Co. in Pennsylvania has used 15-ton "Eucs" for years and now has added two R-15 Rear-Dumps to their hauling fleet.

STAY ON THE JOB LONGER

Victorville Lime Rock Co. in California uses 2 Model R-15 "Eucs" for hauling rock and overburden. Rugged body and frame withstand the impacts of loading, hauling and dumping heavy excavation in construction, mine and quarry service.

Built for heavy off-the-highway service, 15-ton Rear-Dump "Eucs" have paced the field for over 20 years. They've reduced hauling costs on hundreds of the toughest jobs in mine, quarry and construction work . . . delivered "plus" performance year in and year out.

This model R-15 incorporates the engineering advances, the easy operation and maintenance features, resulting from unequalled field experience with other Euclid Rear-Dumps of the same capacity. It provides the dependable work-ability that means more payloads per day at lowest cost per ton or yard moved.

Have your Euclid dealer give you full details on this new 15-ton Rear-Dump and the complete line of Euclid earth moving equipment. He'll be glad to show you why so many users have proved for themselves that ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

The R-15 is your BEST BET for Lower Hauling Costs!

Advanced design results from 20 years of leadership in building off-highway Rear-Dumps

Some of the* OUTSTANDING FEATURES *of the R-15

- 10½ yd. body 30,000 lb. payload
- 218 h. p.
- loaded top speed of 25 m.p.h.
- hydraulic booster steering
- air assist clutch
- free floating springs
- 14.00 x 24 drive tires (16.00 x 25 optional)

POSITIVE CONTROL OF DUMPING

Double-acting 3 stage Euclid hoist and hydraulic system gives the operator fast, positive control of the body position at all times. Dumping angle of the body, in fully raised position, is 68°. Body, frame and hoist are designed and built as an integral unit. McDowell & McDowell are using six R-15 "Eucs" to haul heavy excavation at a big plant site job in Nashville, Tennessee.

SPEED AND STABILITY

The 5 speed transmission and Euclid planetary axle provide a top speed of 25 m.p.h. with full 15 ton payload . . . 27 m.p.h. with 16.00 x 25 tires. Free floating Euclid spring suspension gives maximum stability empty or loaded under all road conditions . . . permits faster safe travel speeds. Dale Bloom had a fleet of 6 Rear-Dump "Eucs" on this Kansas Turnpike job—2 of them the Model R-15.

EASY OPERATION

Full width cab offset to left for maximum vision, air assist clutch, booster steering, 218 h.p. engine, fast acting hoist, free floating springs and fully adjustable seat contribute to driver comfort and easy operation. Four of these new Rear-Dumps worked on a highway relocation job of W. J. Menefee Construction in Missouri.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

SPECIAL REPORT

On the St. Lawrence Seaway

As of the 15th of October, 1955, 17 Manitowoc Shovels, Draglines and Cranes were taking on the "tough jobs" along the St. Lawrence Seaway Project with many more Manitowocs scheduled to appear soon.

Project contractors have found that Manitowoc simplified design, rugged construction, fast mobility and all-around job versatility pays off in speeded-up work schedules.

Put all of the job-tested Manitowoc advantages to work on your next bid. Contact your Manitowoc distributor for the whole "profit-happy" picture.

MANITOWOC ENGINEERING CORP. MANITOWOC, WIS.

OTHER MANITOWOCS ON THE SEAWAY PROJECT

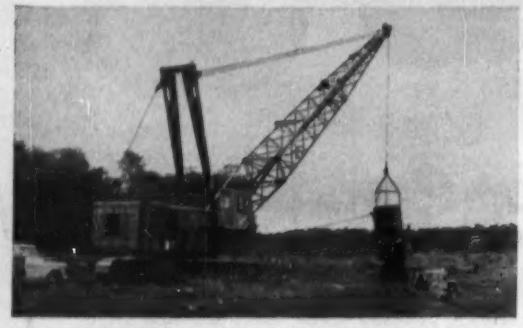
American Bridge Division, U. S. Steel
6 - Manitowoc Model 3500's

Perini, Kiewit, Walsh, Utah, Morrison-Knudsen Combine
1 - Manitowoc Model 4500

Peter Kiewit & Sons Co.
1 - Manitowoc Model 4500

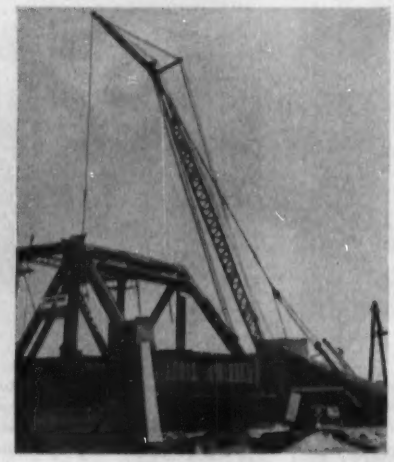
Kiewit-Johnson & Johnson
2 - Manitowoc Model 3900's
2 - Manitowoc Model 4500's

Morrison-Knudsen Co., Inc.
4 - Manitowoc Model 4500's



Equipped with a 6½-yd. bucket, this 4500 dragline operated by Morrison-Knudsen loads 22 cu. yd. wagons in three passes per unit during preliminary work on diversion, cut "F".

This Manitowoc 5½-yd. Model 4500 shovel is excavating at the site of Barnhart Island powerhouse for the combine of Perini, Kiewit, Walsh, Utah, Morrison-Knudsen.



One of six Manitowoc 60-ton 3500 cranes operated by American Bridge — this unit shown placing steel at site of "permanent bridge".

One of the first machines on the St. Lawrence project, this 2½-yd. Manitowoc Model 3500 is shown excavating at the site of Long Sault Dam. The shovel pictured is owned by Drave Corp.

MANITOWOC
SHOVELS 1-5 YD. Speedcrane CRANES 20-100 TON

Business Investment Holds Key To Both Growth and Stability

What federal tax policy will best promote both growth and stability in the American economy? The Joint Economic Committee of Congress has been asking this crucially important question in public hearings. This editorial suggests one vital part of the answer.

The proposition advanced here is that—

> Tax policy must encourage a continuing high level of business investment in new plant and equipment, because such investment makes a special contribution to *both* economic growth and economic stability.

Growth Needed for Security

We must have both growth and stability.

A vigorous economic growth is essential to our national security. As Congressman Wilbur D. Mills said in launching the Joint Committee's hearings, "The present complexion of world affairs places a premium upon strength and growth in our national economy." Growth is likewise a major ingredient of a healthy domestic economy. Growing enterprises and growing communities offer far more opportunities for satisfying careers than those which are not growing.

A reasonably stable economy, without violent ups and downs, is also essential to our national welfare. Extravagant booms and their more or less inevitable result, severe depressions, waste labor and resources and cause great human misery. Both major political parties have accepted the obligation imposed by the Employment Act of 1946, that the federal government work to maintain high and stable employment.

There is general agreement that **the key to economic growth is investment in new plant and equipment.** Growth depends decisively on new facilities to increase production, and also to produce new and better products in new and better ways. At the same time, new plant investment provides employment for the important, and well-paid, one-fourth of our industrial workers who manufacture and build new production facilities. So if the process of business investment is kept on an even keel, the result is not only growth but also stability in a substantial sector of our economy.

But authorities disagree on the possibility of maintaining a high level of business investment for any great length of time. Some fear that it will lead to an excess of producing capacity and the glutting of markets, with recession or depression not far behind.

continued on next page

The history of our country offers some basis for the fear that it is dangerous to maintain a very high level of business investment. There have been times when the economy has suffered under the weight of excess producing capacity. **This fear, however, has been made obsolete by the recent course of our economic history which, in its earlier phases, nourished the fear.**

The World Has Changed

Here are some of the major considerations, cited at the Joint Committee hearings, which support the conclusion that we not only *can have* a high level of business investment and economic stability but that we actually *need* a high level of such investment to assure stability.

(1) Over the next 20 years our population is expected to increase by about one-third. But most of the population increase will come in age groups younger or older than normal working ages, and people will probably work fewer hours per week. Thus hours worked are not expected to increase more than 15%. Consequently, we must have a relatively large increase in the amount of production equipment per worker if our standard of living is not to suffer. This means a high level of new investment.

(2) About half of our present business investment goes to replace worn-out equipment, rather than to expand capacity as was true during the early stages of our industrial development.

(3) Thanks largely to the impact of organized research—for which we as a nation now spend about $4 billion a year—a large share of capital investment now goes to provide new products and new processes, rather than to expand existing capacity.

These developments make it unlikely that we shall develop the burden of excess capacity that plagued the economy in earlier periods. **Moreover, most capital investment plans are now made on a long-range basis. Companies are building facilities to anticipate their needs for several years ahead.** This increase in long-range planning has reduced the disturbing effects of temporary shortages and excesses in producing capacity.

The record of recent years speaks for itself. Business spending for new plant and equipment in 1955 was over $29 billion. This continued the high level of investment that has been maintained for the past ten years—a decade remarkable for both impressive growth and gratifying stability. A McGraw-Hill survey of preliminary plans for 1956 indicates another year of increasing investment, and expanding business activity.

Tax policy, to be successful, must consider this impressive contribution of business investment to both growth and stability.

Of course, the level of investment depends on many factors other than federal tax policy. The degree of business confidence is important. So is the strength of consumer markets. So is the attitude of organized labor toward the use of more efficient machinery. But tax policy is a crucially important factor. And it is becoming more so with new developments in our changing economy. These developments indicate that tax policy **must be geared to foster a high level of business investment, if the dual objectives of economic growth and economic stability are surely to be attained.**

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

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The Engineer's Field Report

CASE HISTORY
LUBRICANT *RPM Delo Oils*
FIRM *Arizona Sand & Rock Co., Phoenix, Arizona*

Sleeve taper only .0045" after 150,000 miles hauling under tough conditions

This Mack tractor's 200 h.p. Cummins diesel went in for its first overhaul after four years hauling heavy equipment to and from Arizona construction jobs. The rig hauls loads up to 25½ tons in on-and off-highway work. Using RPM DELO Special Lubricating Oil since new, inspection after 150,000 miles showed oil return holes clear, all rings free and in good condition, maximum sleeve taper only .0045". Manley Johnston, Shop Foreman, Arizona Sand & Rock Co., reported, "The engine was really clean! It could have gone at least 50,000 more miles."
Arizona Sand & Rock, general contractors for road building projects and operators of a large plant, works its equipment in constant dust and grit...in desert and mountainous terrain. The company depends on RPM DELO Oils to give the protection these heavy-duty engines need under these tough conditions.

Why RPM DELO Oils reduce wear in heavy-duty engines

Detergent keeps parts clean...helps prevent piston scuffing. Special compounds stop corrosion of any bearing metal and foaming in crankcase.

Special additives provide metal-adhesion qualities...protect parts hot or cold, running or idle.

Anti-oxidant resists lacquer formation...prevents ring sticking.

RPM DELO LUBRICATING OILS

TRADEMARK "RPM DELO" REG. U. S. PAT. OFF.

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

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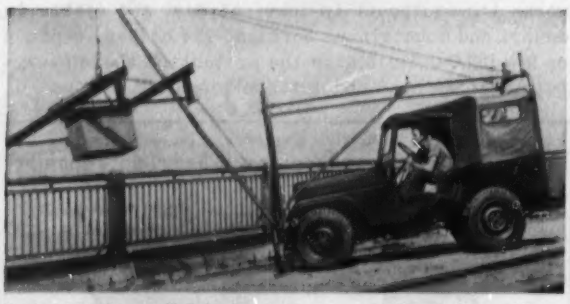
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

Goes anywhere! The Universal 'Jeep' is often the first equipment to reach a construction job, and the last to leave. With the extra traction of its 4-wheel drive, it takes engineers over the roughest ground for first surveys. During construction it carries men and tools wherever they are needed, on or off the road. And when the job is done, it helps speed final inspection work.

How 4-wheel drive 'Jeep' vehicles help contractors save time and money!



'Jeep' with hoist lowers lighting equipment in a bridge deck installation. Because of its light weight, the 'Jeep' can haul materials over new concrete before it is strong enough to support heavy trucks.

'Jeep' Truck with hydraulically-operated back hoe prepares foundations, digs laterals or drainage ditches, and does other jobs too big for hand digging but too small for heavy-duty earth-moving equipment.

Vehicles in the 'Jeep' family help speed work and cut costs in almost every phase of construction.

In 4-wheel drive they go up steep grades—through mud, sand and soft earth—where other vehicles can't go. They shift easily into 2-wheel drive for travel at highway speeds. With power take-off or hydraulic lift, they operate many types of equipment from dozer blades to mobile drills for soil sampling. They stand up to the toughest usage—save you valuable time on job after job. Ask your nearest Willys dealer for an on-the-job demonstration or write for information.

The 'Jeep'®

family of 4-wheel drive vehicles

WILLYS... makers of the world's most useful vehicles

WILLYS MOTORS, INC., TOLEDO 1, OHIO

DAILY INSPECTION of places where trouble is likely to occur, such as at the upper nest of sheaves, can prolong cable life.

CABLE DRUM is where the cable is most likely to show signs of wear because of overlapping action as it wraps around the drum.

Lengthen Scraper Cable Life

IT DOESN'T COST MUCH to replace a broken scraper cable, but while repairs are being made your rig isn't moving any dirt, and when it isn't moving dirt, it isn't making money.

Any cable will fray and break in time, but the manufacturers say you may not be getting the wear out of your cables that you should get.

M. W. Dargel, Caterpillar's assistant service manager, believes there are two main reasons for shortened cable life: Improper operation of the cable control and failure to make daily inspections of the most common trouble spots.

Daily cable inspections can save a cable from breaking right in the middle of the job, probably when the scraper is carrying a full load.

The first place to check is the cable drum. Wear occurs here because of the overlapping or wiping action of the cable as it wraps around the drum. Improper lubrication of sheaves and rollers is another major cause of wear. The daily inspector also should check to see that the sheaves and ejector rollers are aligned and turning freely. These checks do not take much time, and they pay off in longer, trouble-free cable life.

When a cable does have to be replaced, be sure when you install the new cable that you leave approximately two wraps of ejector-apron cable on the cable control drum when the scraper ejector is at the extreme rear position with the apron down. With the bowl at ground level, there should be five or six wraps of bowl cable on the drum.

To help the operator extend cable life, manufacturers are equipping some scraper units with a "cable saver" device that prevents cables from being overstressed. The cable saver consists basically of one master cylinder located at the forward end of the ejector track and another at the gooseneck near the upper nest of bowl lift sheaves. The master cylinders are connected hydraulically with two slave cylinders located on top of the cable control housing.

Before the ejector and bowl reach their stops, the master cylinders automatically trip. This actuates the slave cylinders which force the cable control levers to the hold positions. This stops the ejector and bowl before they reach their limits of travel and prevents the cables from being overstressed.

While the cable saver may help the operator, it does not take the burden completely off his shoulders. Here are some operator's tips that Dargel believes will lengthen cable life:

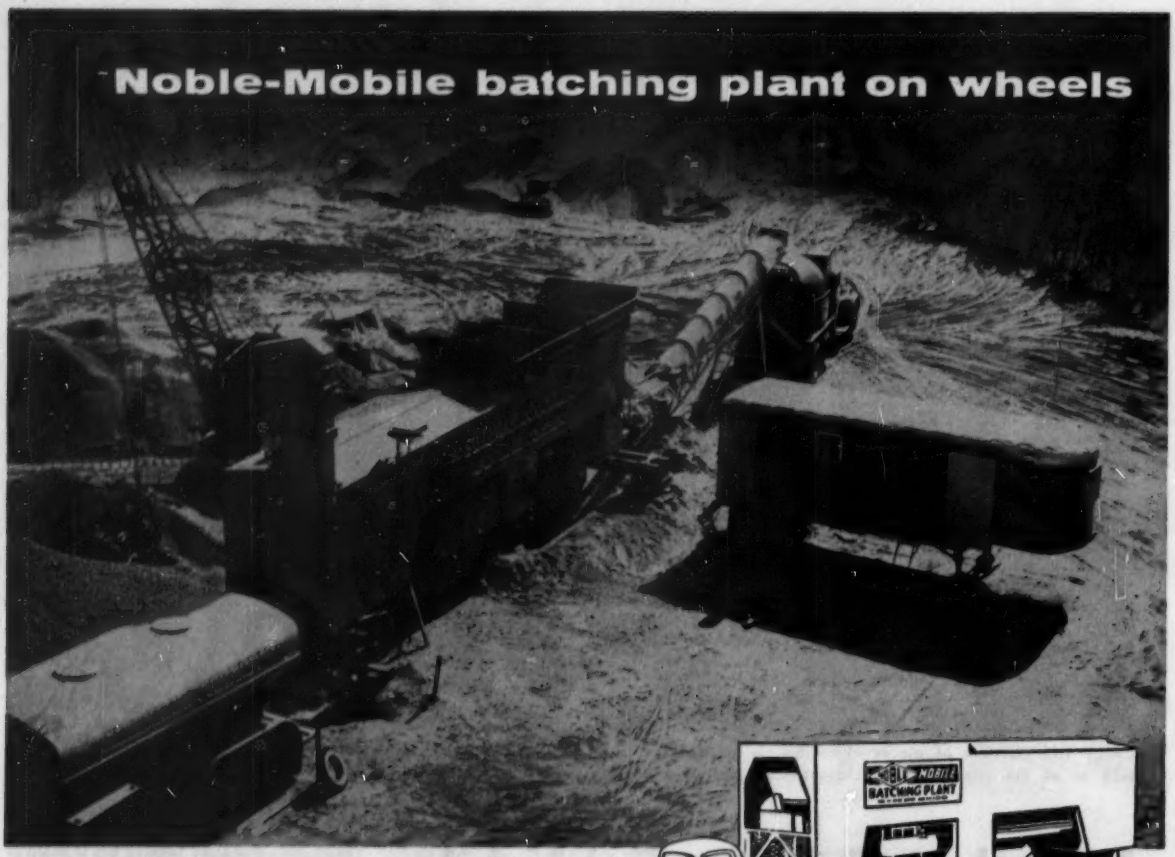
1. When lowering the scraper bowl to the ground, or when setting the cutting edge, do it with a positive action that keeps the cable under tension.

2. When the apron is forced upward by the dozing action of the dirt as the bowl fills up, take up the cable slack and then let out just enough to adjust the apron.

3. Don't overstress the cable when moving sticky material. When working in heavy material, it is normal for some dirt to hang up on the cutting edge when you are unloading because the ejector is not built to go far enough forward to push it all off. After the scraper is unloaded, be sure to keep the cable under tension while the ejector is returning.

4. When moving to the dump area or back to the cut, keep the cable control engaged in order to keep the cable from free spooling.

Noble-Mobile batching plant on wheels



lets you batch at site of fringe jobs and makes those jobs pay

Photo of post-flood reconstruction job in Shelton, Conn., using Noble-Mobile. Owner: Silliman & Godfrey, ready mixed concrete.

Haul Noble-Mobile to job site like a semi-trailer • Set up in one day—no wiring, footings or crane time required • Charge aggregates with front end loader, crane or conveyor • Plant utilizes bulk cement—cement batched automatically • Excellent quality control • Maximum production from mixer trucks—short hauls, more yards per day • Production capacity 60 to 100 yards per hour. Covered by patents pending.

NOBLE BATCHING PLANTS

Portable, semi-portable or stationary plants designed and built by Noble Company · 1860 - 7th St., Oakland 20, Calif. TEmplebar 2-5785

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Loggers & Contractors Machinery Co., Portland, Ore.

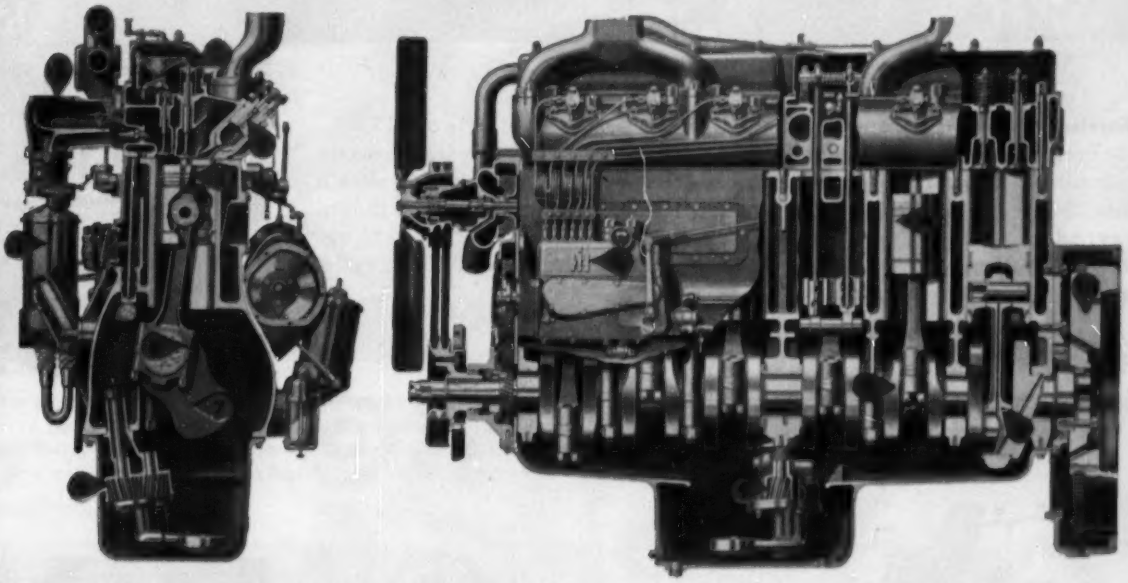
1 FULL FLOW OIL FILTER—Before oil goes under pressure to engine bearings, all harmful particles are removed by replaceable plastic-impregnated, full-flow filters.

2 POSITIVE ROTATORS EXTEND VALVE LIFE. Exhaust valve rotators keep valves turning, at all engine speeds, distributing heat uniformly around the valves to keep deposits from building up on stems and seats, and also to prevent sticking, scuffing, and burning.

3 POSITIVE ALL-WEATHER STARTING. Seconds-fast, International Diesels start in coldest weather on exclusive gasoline starting system. Cylinders are pre-heat conditioned to give complete, clean combustion, instantly, on switching to operation on Diesel fuel.

4 ALUMINUM-ALLOY PISTONS have a thick crown at the top for rapid dissipation of excess heat direct to the cooling water. Hardened, replaceable, cylinder sleeves, three compression rings, with top ring chrome-plated, plus two oil control rings assure long-lasting, gas-tight seal for high compression ratios of over 15 to 1 . . . providing top fuel and oil economy.

5 SIMPLE, SINGLE-HOLE, INJECTION NOZZLE and pre-combustion chamber set at 45° angle for smooth, clean combustion of low grade No. 2 fuel oil under all engine speed and load conditions.



6 NEW IH INJECTION PUMP: Single plunger type on four-cylinder models, twin-plungers on six-cylinders . . . provide all cylinders equal amounts of fuel, precisely metered to load, whether for idling, maximum horsepower, or maximum torque under overload. New, harder injection plungers have up to four times longer life.

7 HEAVY-DUTY FORGED CRANKSHAFT with large diameter, induction-hardened journals provides long-lasting, wear-resistant bearing surfaces . . . rifle-drilled for full pressure lubrication . . . dynamically balanced for smooth operation.

8 REPLACEABLE TRI-METAL BEARINGS provide precision clearance for full-pressure lubrication and thousands of hours of heavy-duty work. Smooth electroplating of white alloy metal over copper-lead, precision bonded to a steel back, carries heavy loads with minimum friction.

9 FULL-PRESSURE LUBRICATION for long life. Big, gear-type pump delivers oil under controlled pressure through full-flow filters and rifle-drilled passages to main and connecting rod bearings, piston pins, camshaft, timing gears, and valve rocker arms.

10 HEAVY FLYWHEEL helps to maintain uniform speed under widely varying load conditions. Available to match standard makes of clutches, fluid couplings, and torque converters.

Hour after hour . . year after year

INTERNATIONAL ENGINES

. . . stay on the job with least upkeep

All International engines are built throughout to give you a full measure of power that stands up and stays on the job. They are precision-manufactured of thoroughly tested materials under continuous, quality-control inspection. Pressure lubrication through rifle-drilled crankshafts and internal passages assures trouble free performance. Inbuilt precision is fully protected from dirt and grit under the worst of job operating conditions by the best of fuel, oil, and air filters.

Heavy-duty radiators, power take-offs, and other factory-engineered power unit components are available to fit these long-life, money-saving engines to your job requirements. You can also get them as original equipment in most makes of construction machines. Call your nearest International Industrial Power Distributor or Power Unit Dealer for all the facts.

There's a size and type of International engine to fit your needs . . . from 16½ to over 200 hp.

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER

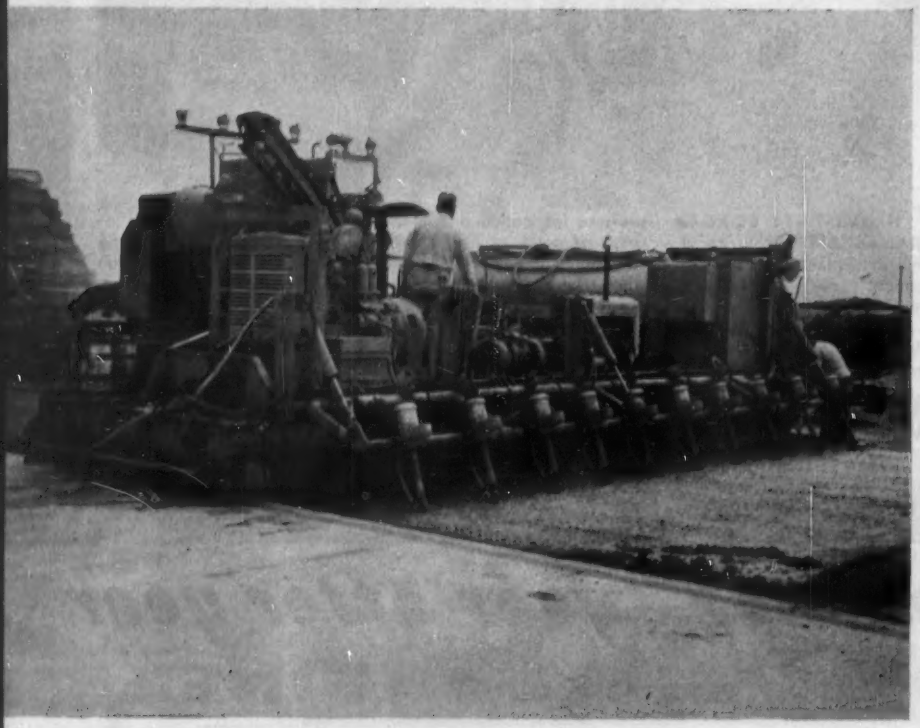
MAKES EVERY LOAD A PAYLOAD

A PICTURE REPORT OF

INTERNATIONAL POWER

Boosting job production everywhere

Morrison-Knudsen Co. and Landers & Griffin Inc., joint venturers on $17,000,000 Portsmouth (New Hampshire) Air Base, are laying 423,000 cu. yds. of concrete with this spreader. Its 10 International-powered vibrators continuously work a strip 25 ft. wide, 14 inches thick. All concrete is being laid for 200 x 11,620 ft. runway and 1,000 x 8,500 ft. apron. Also on the 5,788,000-yd. job are 6 TD-24 torque converter pushers and 16 self-propelled scrapers. Their output on 10,000-ft. cycles averages 1,400 pay yds. hourly.



This International "300" tractor is economically doing a job normally assigned a much bigger, more expensive machine . . . moving 1000 cu. yds. Heaping 8 cu. ft. of sandy loam per load, it completes a 100-ft. cycle every 1½ minutes. "300" is building a running track for a school in Greenville, Mississippi, will take 7 to 10 days.

3000-ft. cycle every 3 min. is the record of Western Construction Co's "55" Payscraper. This includes time for TD-24 to push-load 10 pay yds. of ripped caliche. Area, near El Paso, Texas, was once considered too steep and rocky for development. Soon, thanks to International power, it will be graded and terraced for 250 quarter-acre lots.

"Ideal for dozing rock," says Paul Weaver, Supt. for Joe Wenke Quarries, of this veteran TD-14A. "We use it continuously for shovel and quarry-floor cleanup. Performance has been excellent. Downtime is way down, due partly to rugged construction, partly to prompt parts delivery service from our International distributor." Quarry, located at Toledo, Iowa, produces 200 tons of 1-inch road stone per hour.

Fast on job, fast between jobs—Handling all tractor work in a quarry near Denver, Colorado, 200 hp TD-24 saves time by driving job-to-job at 7.8 mph. Output, 2200 tons of 1¼-inch stone per 8-hour shift, is taken from crusher by International-powered belt conveyor, background, then stockpiled by TD-24. Unit also does all stripping.

Ripping 150 yds. of concrete in front of a Camden (New Jersey) filling station was a job too tough for a ¾-yd. shovel, according to engineers. Al Pangia's International Drott TD-14A, however, did the work unassisted. Unit's tremendous break-out force, 17,000 lbs, broke up the slab . . . even tore out 5-ft. concrete footings.

International

makes every load a pay load

INTERNATIONAL HARVESTER

Industrial Power

A machine size for every job . . . see your nearest INTERNATIONAL DISTRIBUTOR for details.

PAYSCRAPERS

CRAWLER TRACTORS

WHEEL TRACTORS

ALLOY International Drott Loaders . . . International Scrapers, Motor Graders, Wagons . . . and International Superior Pipe-Laying Tractors

"Our TD-14A DROTT rips out CONCRETE SLAB and FOOTINGS a ¾-yard power shovel couldn't touch"

—Pangia Construction Company, Atco, New Jersey

Smack 8-inch-thick slab, or 5-foot-deep footings, of pipe-laced concrete with the 17,000-pound break-out force of an International Drott TD-14A. And something's got to give!

The pictures tell you what gives as this TD-14A Skid-Shovel, owned by Pangia Construction Company, Atco, New Jersey, slams through a 150-cubic yard concrete excavation job—for a new Sinclair station in Camden.

"We are ripping out concrete slab and footings that a ¾-yard power shovel couldn't touch," reports Owner Albert J. Pangia. "The operation is fast because of the breakout action. We use our TD-14A Drott Skid-Shovel for everything."

● Why not size-up these big advantages that give you new loader job range, yardage capacity, and profit opportunities? See your International Drott distributor for a Skid-Shovel or Four-In-One demonstration!

No other loader has it!

Apply the scientific lever principle of *exclusive and patented pry-over-shoe break-out, plus ground-level bucket roll-back.* And an International Drott Skid-Shovel gives you up to three times as much concrete-smashing, frost-breaking, boulder-bucking break-out force as other front-end loaders can deliver. *No other loader even has skid-shoes!*

This great hydraulic pry-out power over big skid-shoes shunts stresses directly into the ground, too —so they can't maul bucket or tractor.

And only an International Drott has the shock-swallowing protection of patented Hydro-Spring—that reduces the effects of carrying, dumping, or other impact forces to *operator* and *tractor* by 67 per cent, or more—increases equipment life by a reported 25 per cent. *Hydro-Spring also eliminates most hydraulic hose failures!*

INTERNATIONAL HARVESTER

INTERNATIONAL® DROTT

Wire Rope at Work — This is the skeleton of The Parkade, located on the Plaza, Camden, N. J. When finished, The Parkade will be an air-conditioned building with the wings of each floor reserved for offices. The center portion of all floors and the entire roof will be devoted to parking facilities, thus helping to alleviate a problem that has become acute in this part of the city. The Parkade is owned by the Nedmac Corporation; Terminal Construction Corporation is the builder.

The work of construction called for erecting 3500 tons of fabricated steel on a very tight schedule. One 60-ton and three 50-ton cranes were employed, each equipped with a 100-ft boom and Bethlehem wire rope. On any job of this nature Bethlehem rope is a tireless servant, willing and able. It proved so here. Bethlehem Purple Strand was used on all the lifts, and the hefty structural members were swung into place like matchsticks.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:

CONSTRUCTION • MINING • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING

HOW TO HANDLE
WET JOBS

REMOVE 600 MILLION GALLONS FROM FLOODED QUARRY

Alpha Portland Cement Co. plant at Martins Creek, Pa.

HIT BY HURRICANE Diane, Martins Creek leaped its banks and flooded this quarry over 100 ft deep — shown by dotted line in photo.

WATER LOWERED 87 FT—14 ft to go — as Griffin pumps perform dependably and economically in one of the largest dewatering projects ever completed.

Griffin personnel and equipment were rushed, plans set and pumping started — all in 5 days. Quick Griffin service and reliable equipment helped Alpha resume production ahead of schedule.

GRIFFIN
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881 East 141st Street, New York 54, N. Y.
Hammond, Ind. Houston, Tex. Jacksonville, Fla.
In Canada: Construction Equipment Co., Ltd.
Toronto Montreal Halifax

Contractor Labor Relations...

by LEON B. KROMER, Jr.

Plan Now For Bargaining

IT'S NOT TOO EARLY to start making up that "punch list" of changes you would like to see in your union agreements this year. Too often contractors sit down to negotiate with union representatives without any changes or modifications to propose. The union committee, on the other hand, usually has quite a list. This lack of preparation can put contractors completely on the defensive. If you are a member of a negotiating committee, it's time your committee got to work.

There are many provisions in agreements that work unnecessary hardship on contractors. Other provisions may be so poorly written or ambiguous that they lead to disputes between the union and contractor. As you are confronted with these, make notes of them. You may forget by the time you sit down with your committee to discuss negotiations.

Prior to meeting with the union's committee the contractors' negotiators should have several meetings of their own. They should go over the agreement, making notes of any changes, deletions, additions that are desired. Don't forget to notify the union that changes are desired. This is usually by registered mail and must be done within the time limit specified in the agreement.

When your committee sits down for a preliminary meeting some of the major points it must consider are:

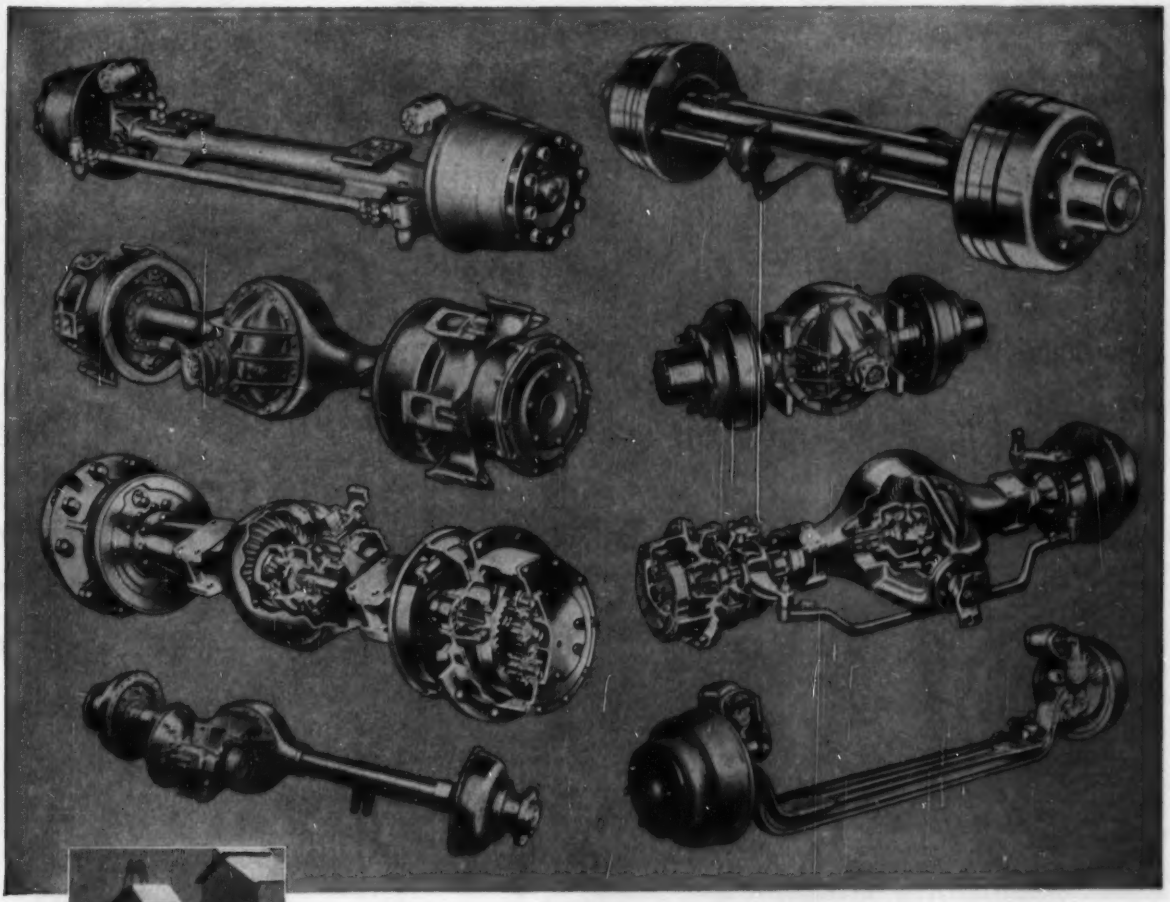
1. Duration of the agreement. Many agreements are being written to cover more than one year. The most common long term agreements are for two years. They are non-reopenable during the period and contain agreed upon automatic wage adjustments to be made during the life of the agreement. The cost of living index is no longer a factor in wage increases. Many contractors and unions like the longer agreements and for much the same reason—stability of labor relations. For the contractor it also means less guess work when bidding a job. So, decide during these preliminary meetings what type of agreement your group prefers.

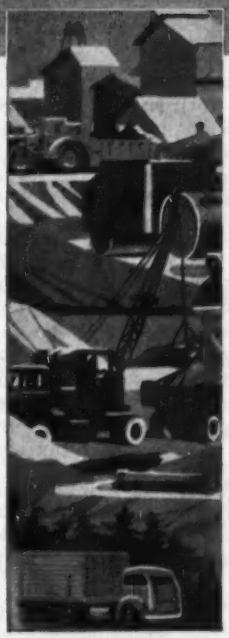
2. Wages. This item is tied to the length of the agreement. Long term agreements carry a price tag so that any adjustments you might be willing to agree upon depend upon the length of the agreement. There are, of course, other factors that determine how much of a wage adjustment will come out of negotiations-volume of work in the area, number of "rush" jobs going on, number of outside contractors performing work in the area. Reviewing two-year, non-reopenable agreements reached last spring you find as wide a variety of wage increase as these:

New York City—major trades settled for a 45¢ package spread over the two-year period of the agreements; Wilmington, Delaware plumbers got 15¢ each year; Alaska carpenters, 7¢ April 15, 3¢ August 1, 10¢ March, 1, 1956, to carry to March 31, 1957. What is finally arrived at in wage increases to be included in two-year agreements generally comes after many hours of negotiation and compromise.

3. Geographical jurisdiction of agreement. When sitting down with union representatives, contractors frequently are unaware of the geographical area to be covered by the agreement they are to negotiate. Very often union agreements stipulate that it applies to all jobs within the union's territory. You should know the territory to be covered by the agreement and, further, spell it out in the body of the agreement. Every local union is given a designated area by its international union. The area can be included in the agreement by counties, by townships, rivers, etc. However it is done, it should be in the agreement. In this connection, if the union's territory is particularly large, your committee may want to expand its membership to include contractors from other areas. For example, the jurisdiction of one local union in Albany, New York, goes over to Pittsfield, Mass. A major employer in that city was invited to sit on the contractors' committee negotiating with this union.

In the following months CM&E will discuss other contract clauses as possible aids to contractors who will be sitting down early this spring to discuss contract terms with the unions.





A flattering thing to say for *any* working vehicle

CLARK AXLES!

Champions, they say—athletes or revenue vehicles—are as young as their legs; which explains quickly why Clark-equipped vehicles grow old profitably——their "legs" stay young.

Clark builds axles for every type of commercial vehicle

- *trucks and buses*—rugged, easy-to-steer front axles; driving axles, steering and non-steering
- *trailers*—light, rigid, tough axles of high carbon steel tubing; spindles forged integral
- *off-highway vehicles*—specially designed heavy-duty drive axles, steering and non-steering, for industrial machines; axle-transmission drive units for agricultural and industrial applications
- *fork-lift trucks*—axles designed for materials handling equipment
- *housing*—light, exceedingly strong, one-piece forging, heat-treated

What is your need in that vital area of "durable legs?" In Clark axles you get the solid cash benefits of 50 years concentration on transmitting horsepower to wheels: efficiently, economically, durably.

CLARK® EQUIPMENT

A handy-sized Clark Products book is yours on request; indicates several reasons why leading manufacturers find it **good business to do business with CLARK.**

CLARK EQUIPMENT COMPANY, Buchanan 6, Michigan

OTHER PRODUCTS OF THE CLARK AUTOMOTIVE DIVISION—
TRANSMISSIONS • AXLE HOUSINGS • TRACTOR UNITS • TORCON TORQUE CONVERTERS ELECTRIC STEEL CASTINGS • GEARS and FORGINGS • FRONT and REAR AXLES for TRUCKS, BUSES and OFF-HIGHWAY EQUIPMENT.

Constructing hot-mix, heavy-duty Texaco Asphaltic Concrete pavement on runway of Hulman Municipal Airport, Terre Haute, Ind., new home of the jet-driven planes of Indiana's Air National Guard.

CONTRACTORS
Shumaker Bros. Industries, Inc., Indianapolis
Grady Asphalt, Inc., Indianapolis

What type pavement for Airports?

Hulman Municipal Airport at Terre Haute, Ind., new home of that State's Air National Guard, recently completed some major improvements. The old 5,300-foot east-west runway was extended to 7,900 feet and a new 7,000 foot taxiway was added.

The same resilient, all-flexible type of construction was used for both runway and taxiway. A hot-mix Texaco Asphaltic Concrete surface, three inches thick, was laid over a 9-inch water-bound macadam base and a 9-inch stabilized gravel sub-base.

The ability of this type of airport construction to absorb impact and to maintain complete, lasting contact with the supporting subsoil explains its exceptional durability and low upkeep cost. Its first cost, too, represents a worthwhile saving over other pavements having the same load-carrying capacity. Freedom from joints and immunity to ice control chemicals are other desirable features of Terre Haute's Texaco-paved runway and taxiway.

Highway and airport builders will find helpful information on all types of asphalt construction in two free Texaco booklets which can be obtained without obligation by writing our nearest office.

THE TEXAS COMPANY, Asphalt Sales Div., 135 E. 42nd Street, New York City 17
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AiResearch Turbochargers give your stationary or mobile diesels more added horsepower than any comparable turbocharger or supercharger installation!

The application of AiResearch Turbochargers to stationary diesel equipment will overcome excessive noise and smoke problems... jump horsepower to a much higher level... and cut your fuel bills on a horsepower per hour basis.

In addition, it will restore operating efficiency for your diesel power plants at altitude.

Application of these finely engineered power packages to mobile diesel equipment is equally effective... as has already been demonstrated in the remarkable results achieved by the installation of AiResearch Turbochargers on Caterpillar diesel machinery.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability. Your inquiries are invited.

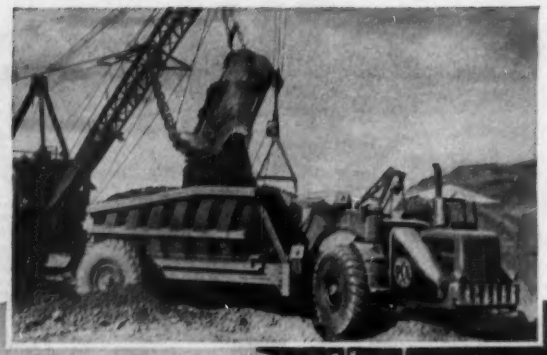
THE GARRETT CORPORATION

AiResearch Industrial Division

9225 Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

"Nylon cord tires reduced off-the-road tire failures . . .



NOW NYLON CUTS TRUCK TIRE COSTS, TOO"

says R. O. LIPPI,

Truck Dept. Mgr., Pacific Coast Aggregates, Inc., San Francisco, Calif.

"When we saw how nylon cord tires cut costs in the toughest of off-the-road service, we began trying them on our trucks, too.

"The results were conclusive. Nylon cords practically eliminated bruise breaks and delays caused by tire failure. We haven't had one blowout with a nylon cord tire! And nylon cord tires give more retreads, more miles per dollar. We expect *double* the mileage we got from ordinary tires.

Switching Whole Fleet to Nylon

"We're sold on nylon—won't buy anything else. We have 126 ready-mix trucks, plus 124 other vehicles. We specify nylon cord tires on all new equipment, and we're replacing ordinary tires with nylon cords."

PROVE TO YOURSELF that nylon cord truck tires give more mileage, more retreads—lowest cost per mile. Ask your dealer about nylon cord truck tires today. (Du Pont makes the tough nylon yarns, does not produce tires.)

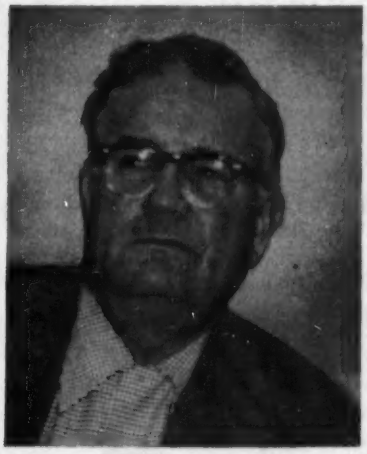
DU PONT NYLON for TIRE CORD

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . *THROUGH CHEMISTRY*

NOW . . . IN PASSENGER-CAR TIRES, TOO . . . THE STRENGTH OF NYLON . . . FOR UTMOST SAFETY . . . SUREST PROTECTION AGAINST TIRE TROUBLE.

Construction Men in the News...



B. "WOODY" WILLIAMS, will be superintendent for Morrison-Knudsen Co., Inc., for construction of Idaho Power Co.'s $87 million Brownlee and Oxbow hydro-electric projects on the Snake River.

M-K holds the contract for the first two of three units planned for development on the 100-mi stretch of the Snake River between Weiser, Idaho, and Hells Canyon.

Williams is no newcomer to heavy construction. For nearly 30 years with M-K he has directed some of that firm's biggest dam jobs. He is an M-K vice president in charge of dam and hydro-electric plant construction.

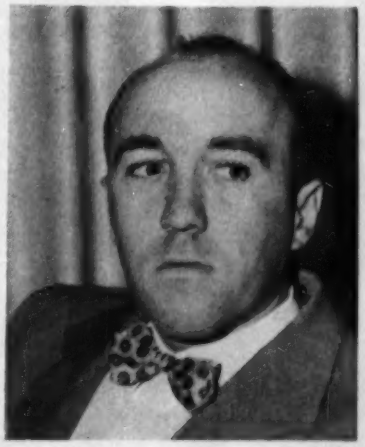
Son of a heavy construction carpenter superintendent, Williams began his career as a roustabout and laborer. His first job with M-K in 1926 was as labor foreman on the construction of Guernsey Dam in Wyoming. He quickly rose to become assistant to the late Frank T. Crowe, who supervised construction of Boulder and Shasta Dams.

Since then Williams has built dams throughout the world. These include Seylon Dam in Turkey, Waneta in British Columbia, Menihek in Labrador, Marguerite in Quebec, and MacArthur Falls in Manitoba. He has constructed more than 12 dams in this country and now is completing Table Rock Dam in Missouri and Donnells Dam, of the Tri-Dam project in California.

Work at Brownlee and Oxbow will begin immediately. M-K is already at work building access roads to the dam site.

Lt. Col. JOHN E. ENGLAND, resident engineer for the Alaska District of the Corps of Engineers, has been named chief of the district's construction division. He replaces Malcolm R. Gilpin, Jr., recently assigned to the Southwestern Division in Dallas.

THEODORE J. KAUER has resigned as chief engineer of the Ohio Turnpike Commission. Former Director of Highways for the state of Ohio, Kauer has been chief engineer for the Turnpike Commission since 1952. He helped establish, as highway director, the design standards for the turnpike, now considered one of the world's safest highways.



LOUIS J. CORBETTA, secretary and a director of Corbetta Construction Co., has been named project manager for construction of a $17.4 million seaport and fuel supply base at Rota, Spain. CHARLES J. PROKOP, executive vice-president, will spend three months in Spain organizing the job while WALLACE J. BUHLER, vice president of Corbetta Equipment Corp., will direct the mobilization of $3.5 million worth of equipment which will be used.

The job is a joint venture of Corbetta and Construcciones Civiles, S.A., of Spain.

Corbetta has been with the firm for 14 years, with three years out

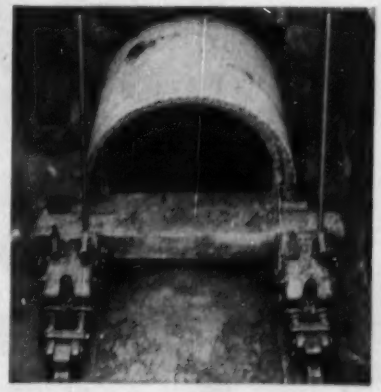
(Continued on page 160)

SAVE HOURS,

CUT COSTS ON YOUR

PIPING JOBS

PUSH PIPE UNDER STREETS, TRACKS, walks, floors and other obstacles with a GREENLEE Hydraulic Pipe Pusher. One-man-operated, portable, simple to operate. No tearing up of pavement . . . eliminates extensive ditching, tunneling, back-filling, tamping, repaving. Cuts job time to a fraction. GREENLEE Hydraulic Pipe Pusher often pays for itself on first job. Two sizes—model shown above for pushing ¾ to 4" pipe. Larger unit, below, for pipe over 4", concrete sewer pipe and large drainage ducts. Power pump also available for extra ease and speed of operation.



GREENLEE

Write today for descriptive literature. Greenlee Tool Co., 2181 Columbia Avenue, Rockford, Illinois, U.S.A.

Instant shifts on the go

BIG NEW ADVANCE in shovel-type loaders is the Hough Model HO 4-wheel-drive PAYLOADER.

And one of the biggest features of this 2-yard workhorse is its great new TORQMATIC DRIVE designed by Allison expressly for shovel-type loaders.

Hough calls this integrated TORQMATIC Converter-Transmission team the "easiest-operating, fastest-acting, most efficient power-shift transmission ever put into a tractor shovel."

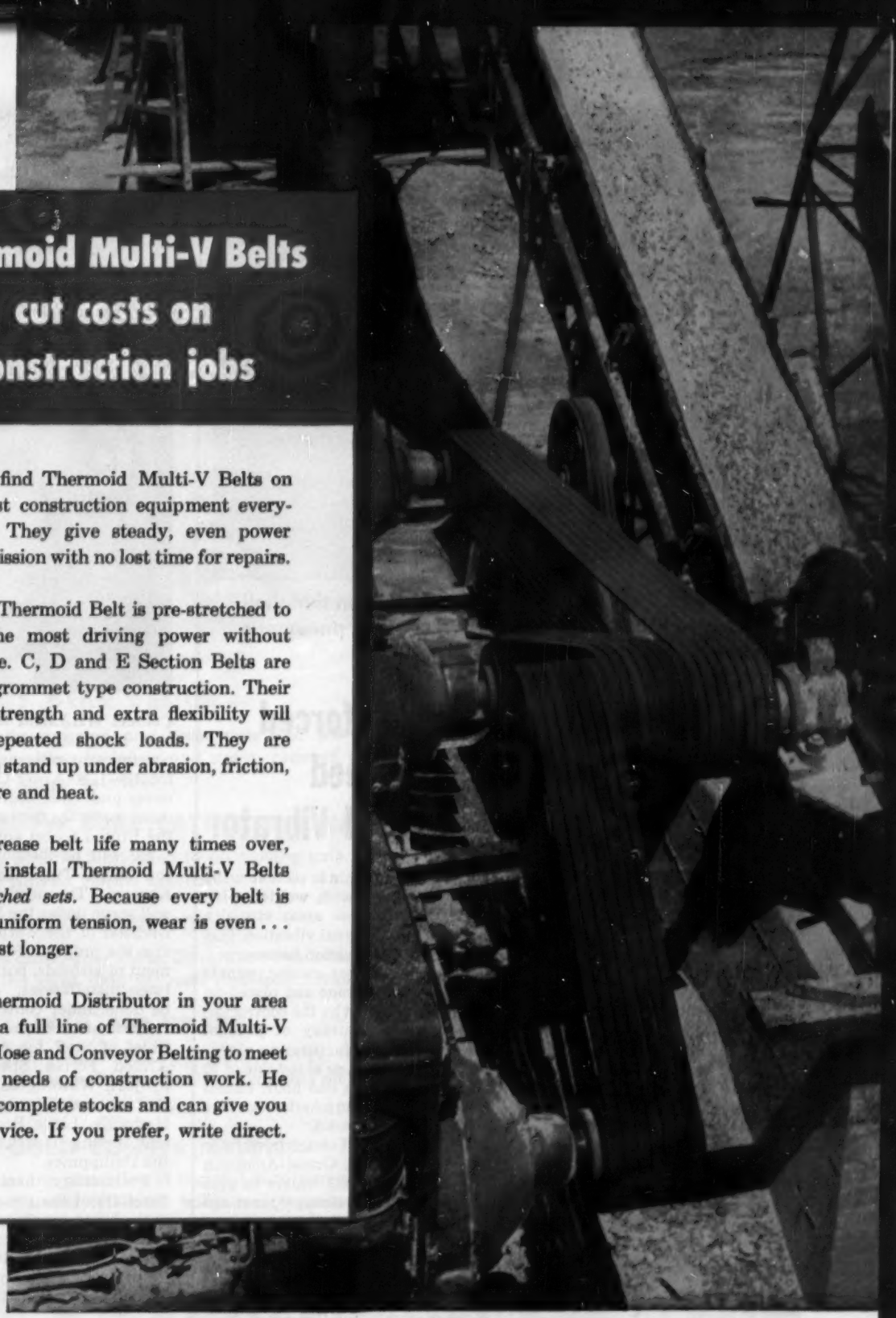
And they also say that the TORQMATIC DRIVE *permits "instant shifting from any speed range to any other on the go —no stopping, no foot clutching."*

That means faster job cycles, easier loader operations, more yardage moved per shift.

The HO PAYLOADER is available with either gasoline or Diesel power. The engines will last longer, operate more efficiently driving through a TORQMATIC Converter because it instantly matches engine speed and torque to the load—multiplies engine torque up to 350% to broaden the *working* horsepower range.

Today Allison's new TORQMATIC DRIVE is available in many models of shovel-type loaders—will soon be offered in a wide range of other equipment made by leading manufacturers.

If you'd build or buy a better product, get full information on this great new TORQMATIC DRIVE by writing to Allison Division of General Motors, Box 894T, Indianapolis 6, Indiana.



Thermoid Multi-V Belts cut costs on construction jobs

You'll find Thermoid Multi-V Belts on the best construction equipment everywhere. They give steady, even power transmission with no lost time for repairs.

Every Thermoid Belt is pre-stretched to give the most driving power without slippage. C, D and E Section Belts are rayon-grommet type construction. Their brute strength and extra flexibility will take repeated shock loads. They are built to stand up under abrasion, friction, moisture and heat.

To increase belt life many times over, always install Thermoid Multi-V Belts *in matched sets.* Because every belt is under uniform tension, wear is even . . . belts last longer.

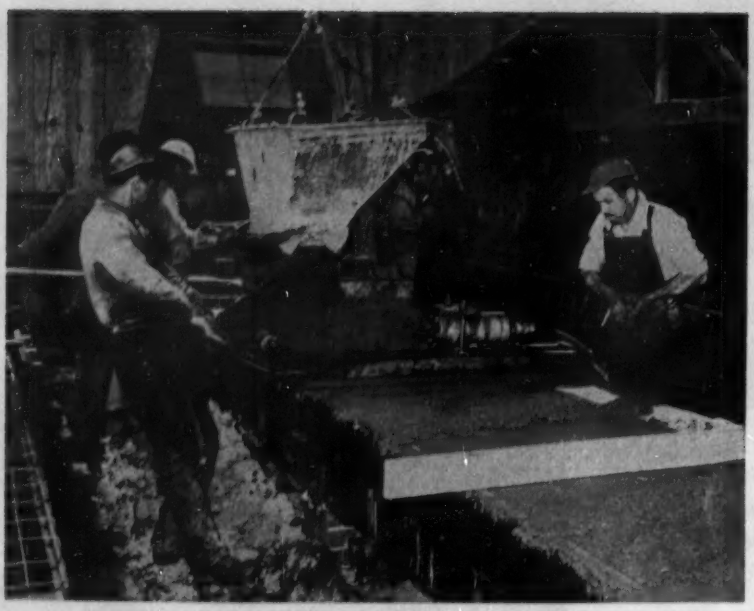
The Thermoid Distributor in your area carries a full line of Thermoid Multi-V Belts, Hose and Conveyor Belting to meet all the needs of construction work. He carries complete stocks and can give you fast service. If you prefer, write direct.

Conveyor & Elevator Belting • Transmission Belting
H.P. & Multiple V-Belts • Wrapped & Molded Hose

Thermoid

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah



WORKMEN ARE SHOWN vibrating concrete in thin-shell precast roof panels using Viber Model PX pneumatic vibrator mounted on screed.

Contractor Casts 2-Inch Reinforced Roof Panels with Special Screed Using Viber Standard External Vibrator

CONTRACTOR FOR MORE THAN 740 precast, thin-shell roof panels for an earthquake resistant reservoir at the new San Pablo Filter Plant, El Cerrito, Calif., devised an efficient method of vibrating reinforced concrete webs only 2 inches thick.

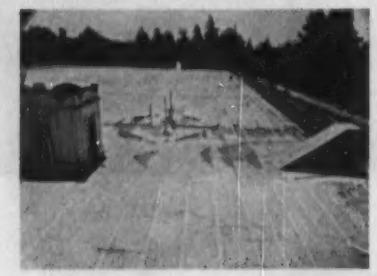
P. Grassi-American Terrazzo Co., San Francisco, developed a screed on which a Viber standard Model PX pneumatic high speed vibrator was mounted. Thus concrete was screeded and vibrated in one operation.

Precast panels were 24 ft. long by 4 ft. wide with webs 2 in. thick. In addition to being thin in section, webs were reinforced with welded wire fabric making these areas virtually inaccessible to internal vibration. This made external vibration necessary.

Following proper curing, panels were hoisted by crane and placed on girders also precast by the contractor. Dimensional accuracy of precast panels was good, facilitating placement which was done at the rate of 10 panels in less than one hour. Panels were then welded to inserts in girders to make structure solid.

Viber's Model PX concrete vibrator selected by the P. Grassi-American Terrazzo Co. is used widely in pipe yards and tunnel lining operations wherever reusable steel forms are set up for use on a production basis.

For further information on Viber's complete line of internal and external vibrators, contact your authorized distributor or Viber Company, Dept. 8-A, 726 So. Flower Street, Burbank, California.



PRECAST ROOF PANELS shown welded in place were set on girders by truck-crane. Channel side is 8 inches deep and has shelf to retain grout seal.

VIBER

CONCRETE VIBRATORS SINCE 1931

CONSTRUCTION MEN . . .

Continued from page 157

for service with the U.S. Army Corps of Engineers in France.

In recent years he has been roving general field superintendent for the firm. Before that he was field superintendent for construction of the sub-structure caissons for the Thruway Tappen Zee Bridge across the Hudson River in New York.

Colonel WILLIAM A. DAVIS, Jr., will head the newly established construction program in Pakistan for the U.S. Army Corps of Engineers under the mutual aid agreement recently concluded between the United States and Pakistan.

He will be district engineer for the Corp's Trans-East District at Karachi. The new district, which will serve under the Mediterranean Division of the Corps, will supervise the program for the improvement of airfields, ports, and ground force installations. All work will be done under contract.

Davis has been since 1952 Deputy Chief of Staff for Administration, Armed Forces Special Weapons Project, Washington, D.C. Before that he was District Engineer at Nashville, Little Rock, and Guam and Acting District Engineer in the Philippines.

Preliminary arrangements for the start of the program are presently being concluded by Mediterranean Division Engineer Brigadier General B. B. Talley. U. S. and Pakistan officials now are making technical agreements.

GEORGE F. KLEIN, Jr. has been appointed chief engineer of the Catalytic Construction Company of Philadelphia, Pa. He will take over the supervision of some $78 million of construction underway.

EATON FEATURES

reduce hauling costs, keep trucks on the job

PLANETARY GEAR DESIGN—

distributes pressure and wear over four planetary gears, resulting in lower unit stress, reduced maintenance, longer axle life.

FORCED-FLOW LUBRICATING SYSTEM—

supplies positive lubrication to all moving axle parts, even at slowest vehicle speeds.

POSITIVE SHIFT CONTROL—

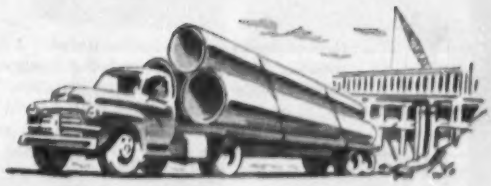
provides quick, easy shifts. Drivers use available gear ratios—the right ratio for road and load conditions.

SELF-CONTAINED AIR BRAKE—

provides for greater braking efficiency; quicker action, quicker release; quick, easy reline. Available on Eaton air brake models.

EXTRA-RUGGED CONSTRUCTION—

eliminates the possibility of harmful distortion or misalignment under full load, holds maintenance to a minimum.



More than Two Million Eaton Axles in Trucks Today!

Ask your truck dealer for complete information.

EATON 2-SPEED AXLES

EATON

AXLE DIVISION

MANUFACTURING COMPANY

CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

THE SURVEYOR'S NOTEBOOK

Reporting on Unusual Surveying Problems and Their Solutions
Notekeeper: W. & L. E. Gurley, Established 1845

A Few "Tricks of the Trade"

Unusual Field Tips Suggested by Readers of "The Surveyor's Notebook"

A Louisiana engineer has come up with an interesting method of locating shot points during seismograph surveys. The shot location was practically inaccessible in the bayous. However, general direction was known from two points on a base. When the shot was sent off, considerable dirt and smoke were blown into the air; and two transits intersected the shot to give location close enough for practical purposes. (*Speaking of inaccessible sights,* the Gurley Telescopic Solar Transit quickly gets around obstructions with sun shots. Procedure of carrying a line forward with a Gurley Solar eliminates one man from a party. The time and labor saved "pay off" the instrument in a few seasons. Write for information on Model 112-RT.)

Gurley Telescopic Solar Transit

• • •

For night work, an automobile spotlight can aid the surveyor greatly. One engineer directs his vertically...uses suspended plumb lines at right angles to each other to plumb the beam. The beam is used for signaling when the transit party is to take the sight...sight is taken on the vertical beam when it appears in the sky.

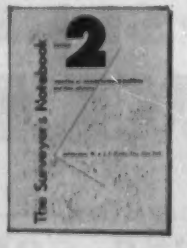
• • •

Some engineers ask for horizontal stadia lines on their transit reticles. This permits use of a horizontal rod—or even a common tape—for measuring distance. Using a right angle prism or Locke hand level with a right angle, a line is laid off perpendicular to the line of sight; and two targets such as pins or range poles are set on this line so that they are exactly matched to horizontal stadia. Distance between the two can then be measured, giving a means of determining stadia distance.

• • •

Can you use these field aids? *Gurley can supply 50-pound test yellow nylon plumb bob cord, to add to the visibility of your string in poor lighting. Also a cord adjustor, which helps you make quick changes in line length in the field. Send 25 cents in stamps or coin for a set of cord and adjustor with a drawing showing how to use them.*

• •



"The Surveyor's Notebook" collection (Series Two) is packed with valuable tips like these. More than 40,000 surveyors and engineers are finding them helpful. Write for your free copy ...At the same time, why not send us your own story?

W. & L. E. GURLEY

521 Fulton Street, Troy, N. Y.

GURLEY Surveying and Scientific Instruments

SALES AND ★SERVICE★

News of manufacturers' activities designed to assist the reader in the purchase of machinery, equipment and materials and help him obtain quick service on parts and maintenance.

Distributor Appointments

Euclid Div., GMC: Ray C. Call Co., South Charleston, W. Va., has been appointed dealer for the complete line of Euclid earthmoving equipment. The territory covers all of West Virginia except the counties of Brooke, Hancock, Marshall, Ohio, Morgan, Berkeley and Jefferson. Call Co. will also represent Euclid in Garrett and Allegany counties in Maryland.

LeTourneau-Westinghouse Co.: Sheehan-Bartling, Inc., of Sioux Falls, S. D., has been named distributor for the complete line of LeTourneau-Westinghouse equipment including the motor graders and TraveLoaders of the Adams Div. Under president Tom Sheehan, the new distributor will cover the entire state of South Dakota.

Molykote Corp.: The appointment of Penn Petroleum Co., Detroit, as exclusive distributor for Molykote lubricants in the Detroit area has been announced. The president of Penn Petroleum, James W. Hopkinson, is currently president of the American Society of Lubrication Engineers.

Detroit Diesel Engine Div., GMC: Appointment of the Hubbs Engine Co., Cambridge, Mass., as distributor for Detroit Diesel marine and industrial engines has been announced. The company will handle the sale of marine engines in Massachusetts, Rhode Island, Maine, New Hampshire, and parts of Connecticut; and industrial engines in Massachusetts, Rhode Island and parts of New Hampshire.

Manitowoc Engineering Corp.: Several new dealers have been appointed to handle the sale of Manitowoc power crane and shovels. Included are the J. D. Coggins Co., Albuquerque, N. M., who will service northern New Mexico; Caprock Machinery Co. of Amarillo, Texas, for northern Texas, and several overseas distributors.

Carboloy Dept. of General Electric Co.: Baldwin Supply Co., Charleston, W. Va., was recently appointed an authorized Carboloy carbide distributor. Baldwin will handle the standard line of tools, and blanks, diamond wheel dressers and masonry drills.

(Continued on page 166)

Versatile "D" Tournapull

has a place on EVERY dirtmoving job

Every "big" dirtmoving job breaks down into work sections . . . some suitable for "big" equipment . . . some suitable for "small" equipment.

The improved D Tournapull fills the need for a fast, flexible, self-propelled scraper which works economically on both big and small-yardage assignments and on both long and short hauls.

Its capacity is 5.9 cubic yards, struck, or 7 cubic yards, heaped. It is large enough and fast enough for profitable use in pusher fleets . . . yet small enough for one-man self-loading. It cuts delays and expense for small yardage sections, clean-up, access roads, shoulders, drainage and other headache jobs that normally eat into your profits.

Not only is the "D" highly versatile, but it runs from one location to the next at speeds to 28 mph.

It travels anywhere . . . over highways or cross-country, over curbs, railroad tracks, bridges. It works fast . . . moves more earth in less time than big crawler tractor-scraper combinations costing thousands of dollars more.

Pictures show some of typical applications. Look over your current dirtmoving projects and you'll find many of these assignments . . . and others . . . where "D" can speed completion and cut your costs.

If you want more information on the D Tournapull, or if you would like to see a demonstration on your job, call your LeTourneau-Westinghouse Distributor. He is always at your service.

Tournapull—Trademark Reg. U.S. Pat. Off. DP-885-G-b

Backfills around culverts

Backfills around buildings

Shapes backslopes

Fine-grades before paving

Blades shoulders

Cuts drainage ditches

Spreads gravel

Handles clean-up

Spreads top-dressing

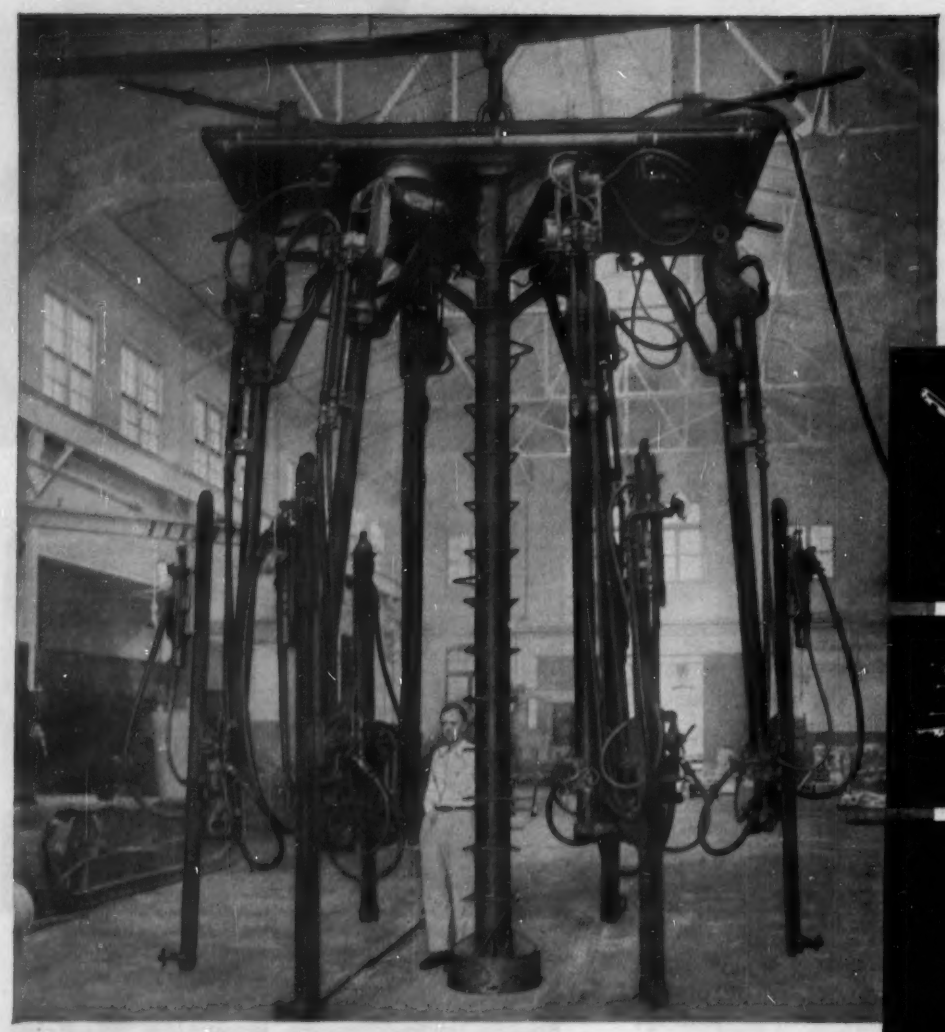
Fills hoppers

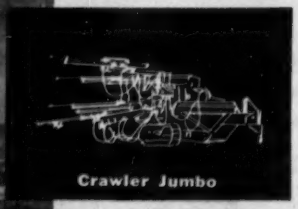
Does production dirtmoving

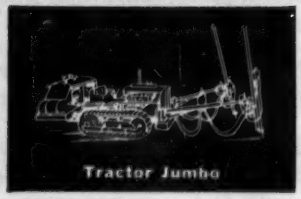
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company







no matter HOW BIG or how small the drilling job

you can do it faster and easier with an I-R HYDRA-BOOM JUMBO

THE giant, octopus-like drill jumbo above was supplied by Ingersoll-Rand for a large shaft-sinking job. Carrying six heavy, boom-mounted I-R drills, each with individual, fingertip control, it is lowered down the shaft as drilling progresses — virtually eliminating setup time and giving maximum footage per shift.

Other typical Hydra-Boom jumbos, manufactured by Ingersoll-Rand Co. are shown above right and illustrate the *unlimited flexibility* of these fast-acting, hydraulically-operated drill mountings. Use them on large jobs or small — for smooth, effortless hole spotting. Let us help you engineer your unusual drilling problems. For the complete, cost-saving story, write today for Bulletin No. 4162.

Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.

5-275

DRIFTERS • JACKHAMERS • DRILLMASTERS • QUARRYMASTERS • CARSET BITS • AIR TOOLS

Rear-Dump's big wide bowl with low-entry makes easy "target" for shovel operator.

Speed 350,000-yd. job

on U. S. Route 460 with 3 Tournapull Rear-Dumps

To widen U. S. Route 460 in Campbell County, Va., from 2 lanes to a 4-lane divided highway, Talbott-Marks Company, Inc., Clarksville, Va., has 350,000 yds. of shale and rock to haul from cuts to fills. Equipment brought in by contractor to handle job included 3 C Tournapull Rear-Dumps and one 1½-yard shovel.

Production figures on a typical 5000′ cycle showed each C Rear-Dump averaged 10 trips per hour. Loads per machine averaged 10 yds. Each rig hauled 100 yards per hour to total 300 yards for the three. Haul route was in fair condition with 7% return grades. Speed and maneuverability of LeTourneau-Westinghouse units kept them well ahead of loading shovel. 90° turn-ability of Rear-Dump lets operator swing hauler quickly into position at shovel for elimination of spotting delays.

Owner A. W. Talbott says units are "Very satisfactory." Two of his Rear-Dumps were driven 354 miles to this job from Hereford, Md., in 18 hours, where they had worked on a 300,000-yd. rock section of the Baltimore-Harrisburg expressway.

If you have a hauling problem, it will pay you to investigate the LeTourneau-Westinghouse Rear-Dump. Write or call us for further production studies and specifications. There's no obligation.

Passing on incline, Rear-Dumps speed along haul route on big, single, low-pressure tires.

There's a size to fit your needs

Model	Capacity	HP	Overall Length
D	11 tons	138	25′2″
C	22 tons	208	30′
B	35 tons	293	37′3″

Model	Width req'd, non-stop 180° turn	
	Travel position	Dump position
D	24′8″	19′2″
C	28′8″	20′8″
B	35′	27′

Check these advantages as applied to your job

Hauls anywhere — Big single low-pressure tires let Rear-Dumps safely travel narrow haul roads, paved highways, city streets . . . haul cross-country over roughest terrain, through muck and soft fills.

Turns in less space — This Rear-Dump makes 180° non-stop U-turn by power steer in less than its own length. It eliminates time normally wasted see-sawing to back into or turn in narrow quarters.

Reduces maintenance — Because these Rear-Dumps have no jack lines, no long drive-shaft, no frame, subframe, springs or tie rods, most common troubles of conventional rear-dump haulers are eliminated.

Dumps fast, clean — Flick of switch activates hoist motor. Body lifts quickly to any desired angle for spreading on run. At full dump position, bowl-lip is behind rear wheels so dump can be made clean over bank. Streamlined body sheds material readily.

Cuts weather delays — Power-transfer differential automatically applies power to drive wheel on firmest footing . . . pulls unit through mud, sand, soft materials which stop ordinary haulers. It's a Tournapull exclusive.

Resists body shock, damage — Three-layer, all-steel, grid-type bowl with tool-steel floor resists loading shocks. Big, wide bowl opening (8′9″ x 10′10″) is easy target for any loading unit.

Improves safety — Multi-disc air brakes have more braking surface on one wheel than most haulers have on all 4. Low center of gravity, good visibility, front-wheel drive, easy control all contribute to maximum safety.

Delivers full power — Torque converter (optional in C size) automatically balances load and torque so you get full horsepower always. Lugging is reduced; shocks in transmission and final drive virtually eliminated.

Reduces fatigue — Big low-pressure tires, 24.00 x 25, and air-foam cushion seat smooth out ride for operator. Electric push-buttons control power steer and 2-way power dump. Eliminated is loss of momentum and all manual work of fighting balky levers.

Insures future earnings — Behind Tournapull prime-mover, you can interchange rear-dump with scraper, bottom-dump, crane, flatbed. These trailing units lower your investment, let you handle any future job efficiently, help you keep your Tournapull profitably busy the year-around.

Tournapull—Trademark Reg. U.S. Pat. Off. R-929-H-b

LeTourneau-Westinghouse Company

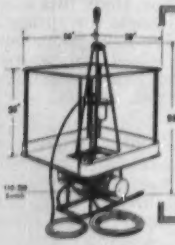
PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

ALBINA CLIMBER

SHOW MORE PROFITS USING A "CLIMBER"

Models are lightweight — electric 175 lbs., air 160 lbs. Powered by ¾ H.P. General Electric motor. Speed 20 ft. per minute. 150 ft. of 5/16" cable. Operated on 110 or 220 volts.



Baskets are interchangeable with electric or air power.

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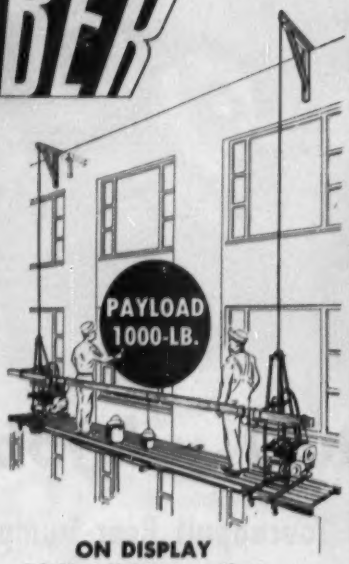
PAYLOAD 500 lbs.



ON DISPLAY
7th Plant Maintenance Show
January 23-26
Convention Hall — Philadelphia
Booth 1556

ALBINA ENGINE & MACHINE WKS
2100 N. ALBINA AVENUE • PORTLAND 12, OREGON

SAVE MONEY
when pouring concrete
RENT ECONOMY
STEEL FORMS

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Easily and quickly assembled
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Complete supervisory service
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Adaptable to wide use
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Save time and material
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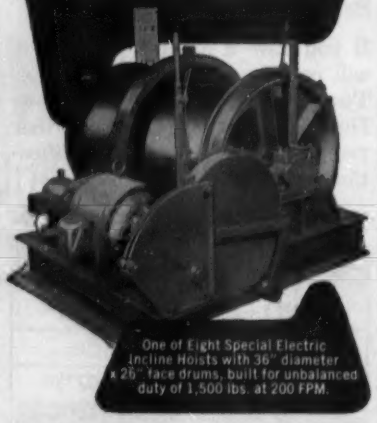
Other forms available on a purchase basis

Write for catalog to
ECONOMY FORMS CORP.
HOME OFFICE • DES MOINES, IOWA

DISTRICT SALES OFFICES: St. Louis, Mo. • Kansas City, Mo. • Lincoln, Neb. • Minneapolis, Minn. • Ft. Wayne, Ind. • Milwaukee, Wisc. • Cincinnati, Ohio • Cleveland, Ohio • Metuchen, N. J. • Rochester, N. Y. • Springfield, Mass. • Washington, D. C. • Decatur, Ga. • Dallas, Texas • Los Angeles, Calif. • Oakland, Calif. • Denver, Colo.

Special Hoists
FROM STANDARD PARTS



One of Eight Special Electric Incline Hoists with 36" diameter x 26" face drums, built for unbalanced duty of 1,500 lbs. at 200 FPM.

• By modifying and re-combining our standard parts, Superior-Lidgerwood-Mundy can engineer hoists to meet your specific requirements at the lowest possible cost.

Write for bulletins and catalogs

SUPERIOR LIDGERWOOD MUNDY CORPORATION

Main Office and Works: SUPERIOR, WISCONSIN, U. S. A.
New York Office, 7 Dey Street, New York 7, N. Y.

SALES AND SERVICE . . .

Continued from page 162

American Tractor Corp.: The W. H. Anderson Co., Detroit, distributor, has appointed six dealers to sell the TerraTrac line throughout Michigan. Throop Farm Equipment of Grand Blanc; Northern Equipment Sales of Bay City; Blackett, Inc., of Farmington; Norman Dupuie Terra-Trac Sales of Lakeville; P. Comperchio Tractor Sales of Jackson, and Raymond G. Knapp of Monroe have been appointed.

On the Sales Front

Baldwin-Lima-Hamilton Corp.: J. V. Gunther has been named to succeed Fred L. Maus as district sales manager for shovels, cranes and draglines in the Southern District. He will operate from the Atlanta, Ga., office and cover Arkansas, Louisiana, Tennessee, Mississippi, Alabama, North Carolina, South Carolina, Georgia, Florida, and parts of Virginia, Oklahoma, and Missouri.

Huber-Warco Co.: John McCaffrey of Pleasanthill, Calif., is the new district sales representative for seven western states, two Canadian provinces and Alaska. He will work with Huber-Warco distributors in Idaho, Utah, Montana, Washington, Oregon, California, Arizona; and with Canadian distributors in Alberta and British Columbia.

Link-Belt Speeder Corp.: N. V. Chehak has been named assistant sales manager. In his new position at the Cedar Rapids, Iowa, factory, Chehak will aid the sales manager, G. W. Rownad, in marketing the complete line of crawler and rubber-tired shovel-cranes.

International-Harvester Co.: Appointment of Duane F. Kuntz as an assistant manager of motor truck sales has been announced by I-H's Motor Truck Div. Kuntz previously was manager of the company's southwest motor truck sales region since 1950.

In the Main Office

Vacuum Concrete, Inc.: Peter J. Doanides, formerly chief engineer of Roberts Construction Co. and president of Concrete Development Corp., both of Johannesburg, South Africa, has been appointed executive vice-president of Vacuum Concrete, Inc. Mr. Doanides, who recently received his engineering doctorate from the University of Athens, designed and constructed some of the world's largest precast and prestressed concrete water storage tanks in Johannesburg.

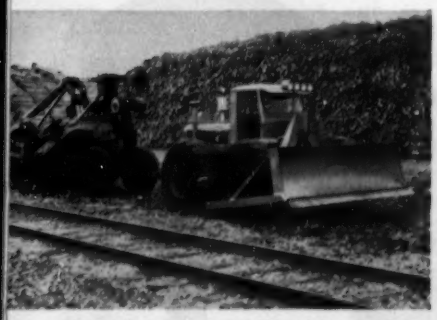
Atlas Powder Co.: Retirement of two directors and election of a new board member were announced re-

(Continued on page 170)

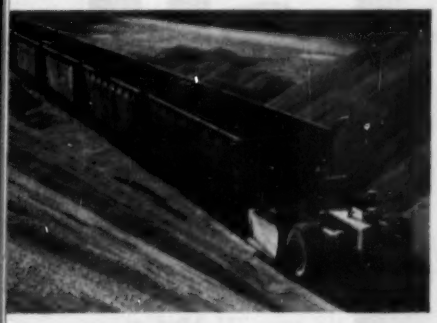
Speed and Mobility

get more work done!

Tournatractor takes the shortest route to job ... via highway or cross country... cuts hours from job-to-job moves.



208 hp Tournatractor with PCU on rear can be hooked up to pull scrapers, rooters, and rollers.



Rubber tires do not damage rails or ties... unit can switch up to 10 fully-loaded railroad cars at once.

Whenever your application involves scattered job assignments, Tournatractor's 19 mph forward speed and extreme maneuverability cuts moving costs and reduces the non-pay hours of moving time. Big, low-pressure tires let you drive Tournatractor anywhere. For long moves, you save time, bother, and expense of locating a trailer, moving in extra manpower and transport equipment, loading and unloading.

Speed on the job

Tournatractor pulls, dozes, pushes at working speeds 2 to 3 times faster than crawler tractors. You have 3.69 mph in second gear, 8.38 mph in third, compared to crawler speeds of around 2 mph in second, and 3 mph in third. Tournatractor travel speed of 19.23 mph compares to the crawlers' top ranges of 4 to 6 mph. You change gears instantly ... waste no time shifting.

8 mph reverse speed

High reverse speeds give a very important time-saving advantage to tractor-on-rubber. Nearly 50% of your working cycle on dozing or pushing jobs is usually spent backing up. Tournatractor's reverse speed cuts crawler backing up time by almost 25 to 50%. Crawler highs in reverse range from 3.1 to 6.2 mph. Tournatractor high in reverse is 8 mph.

Instant shifting

Constant-mesh transmission aids high-speed performance by eliminating delays in changing gears ... saving vital momentum ... gives you any gear ratio instantly. Tournatractor works in higher gear ratios because there is no loss of momentum for shifting. Torque converter increases this advantage by giving you wide automatic over-lapping of gear ratios, without depending on operator to jockey levers to get the most effective ratio of power and speed to load.

Ample flotation and traction

2' wide tires stay on top of soft ground instead of digging in. Lugs bite into underfooting to give traction. Tire pressures as low as 20 lbs. absorb shock. Rolling action compacts loose materials far more effectively than crawlers.

Lower maintenance

There are 4 easy-rolling-wheel-assemblies as compared to more than 500 wearing parts in standard track-assemblies. This means less maintenance. Dollar-wise this reduction in maintenance time can mean a saving of $3 per hour in operating expenses.

Easier to operate

Fingertip electric controls work at the flick of a switch. Steering, raising and lowering the blade, and operating the power-control-unit are all handled by buttons on dashboard. There are no levers, wheels, or other manual controls to handle. Big, low-pressure tires greatly reduce jars and jolts, stress and strain, on both operator and machine.

Interchangeable equipment

Adding to Tournatractor's versatility are a number of interchangeable attachments . . . Bulldozer, Angledozer, Root Rake, Snow Plow. This versatile tractor can also be equipped with a Push-Block, Logging-Winch or Tree-Pusher for additional applications. Drawbar and PCU are available for hauled equipment. Electric-control, open-top scrapers are also available for use with Tournatractors.

Find out for yourself how Tournatractor's go-anywhere mobility and 19 mph speeds can help you get more work done. Compare this rubber-tired tractor alongside your present crawlers. Write or call for a demonstration.

Tournatractor—Trademark Reg. U.S. Pat. Off. T-926-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

HERE ARE 4 FASTENERS FOR YOUR CONSTRUCTION JOBS

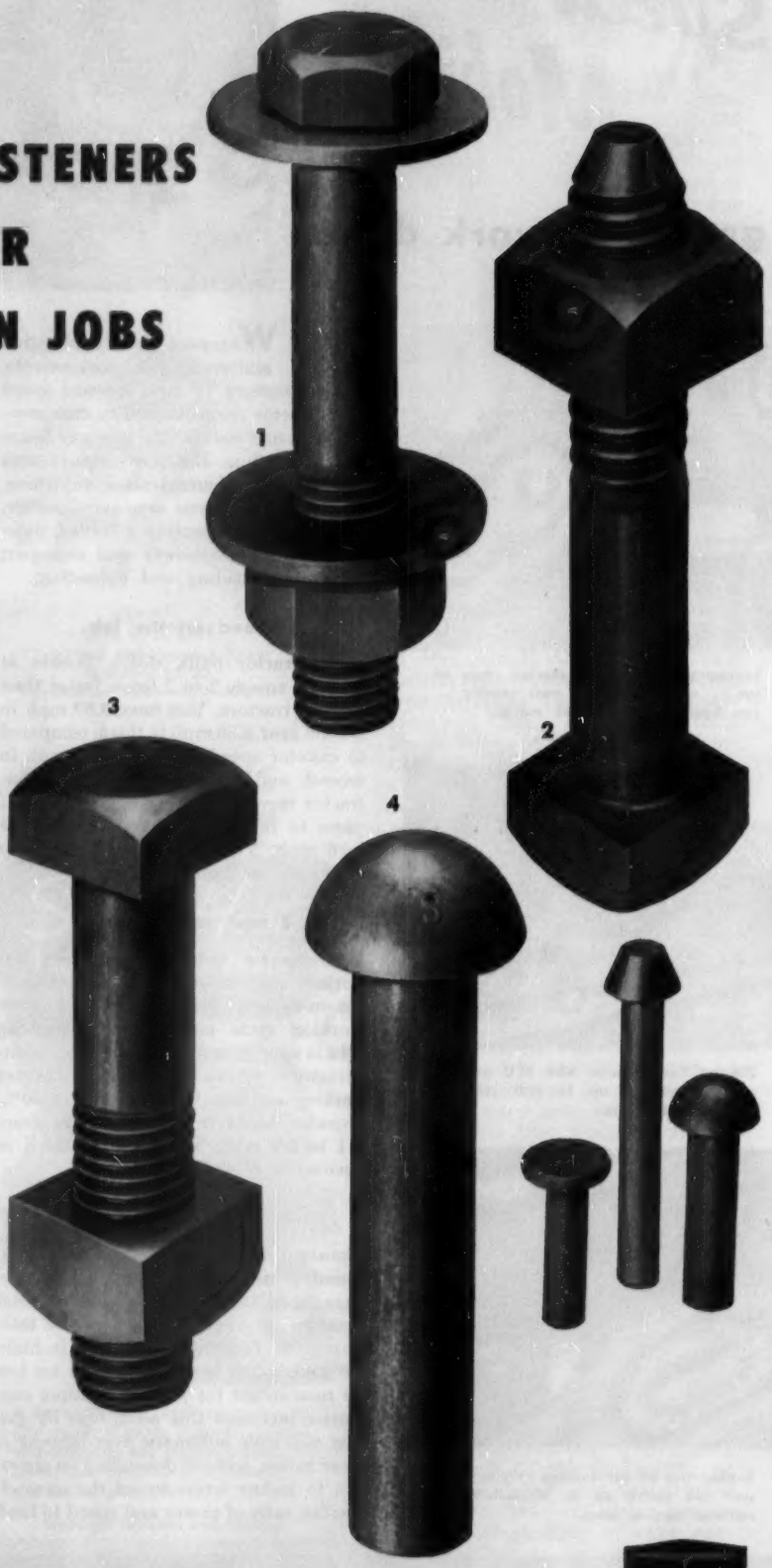
1. HIGH-STRENGTH BOLTS. Rapidly increasing in popularity because of the time they save in steel erection. Used as shown, with two hardened washers. Bolts, made of carbon-steel, are heat-treated by quenching and tempering to meet the requirements of AST'M Specification A-325. Come in diameters from ½ in. to 1¼-in., and in all lengths.

2. FITTING-UP BOLTS. Furnished in low-carbon and high-carbon steel, heat-treated, and with either American National coarse threads or modified Acme threads. Made in styles and sizes to meet individual requirements.

3. MACHINE BOLTS. Made to ASTM Specification A-307. Also furnished in standard grades of carbon or alloy steel. Come with square, hexagon, tee, button, and countersunk heads, and with either cut or rolled threads. Made in wide range of sizes.

4. RIVETS. Furnished in two types, small and large. Complete range of diameters and lengths. Button, high-button, cone, countersunk, round-top countersunk, pan and flat heads. Also swell neck.

In addition to the bolts and rivets shown here, Bethlehem makes many other headed and threaded fasteners for the construction industry, several of which are carried in stock. For full details, write to the nearest Bethlehem sales office.



BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Bethlehem Bolts Are Good Bolts

BETHLEHEM STEEL

How L.G. Arnold, Inc.

licks spongy haul road, 20% grades

C Tournapull loads clay and shale for 3000-ft. haul to roadway seen in distance. Occasional slabs of shale made loading difficult. Avg. load time was 65 sec. over 90-100 ft.

Spongy, soft condition of roadway is shown. On the 12½-mile job, 9000 ft. of drainage pipe and 7 bridge structures will be installed.

Loading sand for sand lift, "C's" "float" over soft footing with big 24:00 x 25 tires.

On regrading 12½ miles of Wisconsin Highway 95, from Blair to Hixton, L. G. Arnold, Inc., of Eau Claire, Wis., found Tournapulls a big help in licking a tough hauling problem. Their job was to widen grade from 20′ with 4′ shoulders to 22′ with 8′ shoulders. It also involved raising the road 2 to 4 ft., including a 15″ sand lift. The other material handled was clay and shale mixed and silty sand.

Three miles of this 612,000-yd. job lay in a swampy area where bubbling springs made road soft and spongy. 3 weeks of rain, after starting the job, made spongy conditions worse.

Equipment used on this project included 7 new C Tournapulls, 3 Super "C's", 6 crawler-scraper units, 10 crawlers for pushing and dozing, 1 rooter, and 2 motor patrols.

7 loads per hour on 6000′ cycle

On a long haul from borrow pit, over a typical 6000′ cycle, each of six Tournapulls on this operation averaged 8.3 min. per trip, 7 trips per hr. Contractor estimated the 6 "C's" averaged 20,000 yds. in a 50 hr. wk. The soft haul road had a 20% grade from highway to borrow pit. Rigs traveled in 2nd gear most of haul distance.

3-mile one-way haul to build 15″ sand lift

Later, the Tournapulls were used to haul the 15″ sand lift on hauls ranging up to 3 miles one way. On the long operation, rolling resistance on the sandy, clayed-loam road was as high as 250 to 300 lbs. per ton. "C's" were equipped with sideboards and 24:00 x 25 tires. These large tires, with 45 lbs. pressure, made it possible for rigs to go through spongy sections in the new grade, trip after trip, without damage to the soft sub-grade.

This time study was taken on the sand lift operation while the 7 "C's" worked a 5.2-mile cycle:

Time in Borrow Pit (2000′ from haul road) ..	6.7 min.
Travel 10,000 ft. @ 16.2 mph avg.	7.0 min.
Travel 2,000 ft. @ 8.0 mph avg.	2.9 min.
Return 11,000 ft. @ 16.4 mph avg.	7.7 min.
Return 1,000 ft. @ 8.0 mph avg.	1.4 min.
Total cycle time	25.7 min.

Each machine averaged 14 yds. per load. On this 5.2-mi. swing the 7 "C's" totaled 1900 yds. per 10-hr. day.

"Sure-footed in wet going"

Performance of the C Tournapulls was praised highly by the men on the job. Said Phil Dudenhoefer, Grade Superintendent, "I like the sure-footedness of the C Tournapulls in wet and slippery going." On the grading operation, Ralph Ring, Master Mechanic, said, "Tournapulls unloaded by themselves while other units had to be pushed to unload."

Commenting on the sand lift operation, Norman Hulett, Superintendent, had this to say: "Tournapull is the most sure-footed piece of equipment I've ever seen on rubber. I never figured I'd see rubber tires go where these can go."

You, too, need speed and versatility to meet your dirtmoving problems, on long hauls, short hauls, in bad weather, spongy footing, and other adverse conditions. Check Tournapulls for the answer. Write or phone your LeTourneau-Westinghouse Distributor for a demonstration on your job. He will be glad to show you how to get lowest-net-cost-per-yard with Tournapulls.

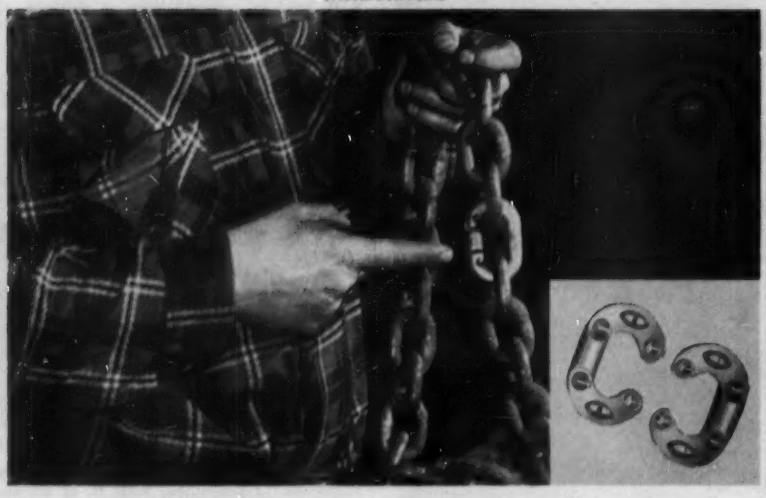
Tournapull—Trademark Reg. U.S. Pat. Off. P-905-H-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

(Advertisement)



"WORLD'S STRONGEST LINK"

Actually stronger than proof-coil chain, famous Laughlin genuine "Missing Links" give an added element of safety on the job to men and equipment. Safety-conscious contractors say, "For safety's sake, we always specify Laughlin, the world's strongest split connecting link." Drop-forged from special forging steel and heat-treated, Laughlin genuine "Missing Links" are matched under pressure for a perfect fit. They are available in a complete range of sizes $\frac{5}{16}$" to $1\frac{7}{8}$" at distributors everywhere.

SAFETY RECORD FOR CROSBY CLIPS, BLOCKS

Working efficiently means working safely. Two products designed for safety as well as efficiency—genuine Crosby Clips and Load-Rated Crosby Blocks—are helping set safety records

on projects across the country. Long-recognized as industry's safest clips, Crosby Clips, with the famous Red-U-Bolt, are specified by more construction firms than any other drop-forged wire rope fasteners.

To safeguard men and equipment, Load-Rated Crosby Blocks have the safe working capacity of each block embossed right on the sideplates. To help keep your jobs safer, insist on genuine Crosby Clips and Crosby Blocks . . . products of the Crosby Products Division, American Hoist & Derrick Co., St. Paul 1, Minnesota.

LAUGHLIN SHACKLES 36% STRONGER

Shackle strength depends for the most part on the kind of steel used. Recent tests show that famous Laughlin drop-forged shackles have an ultimate tensile strength of approximately 75,000 pounds per square inch—36 percent more than ordinary shackles.

RIGGERS WANT SAFETY HOOK

Jobs where one miscue can endanger men and equipment require the safest possible equipment. To prevent loads jarring from the hook—a major cause of accidents—safety leaders specify Laughlin Safety Hooks. Drop-forged Laughlin Safety Hooks are equipped with a powerful, easy-to-operate snap spring latch that guarantees loads cannot slip or jar from the hook and prevents overloading the hook with too many lines. Here's another safe, efficient Laughlin product from the world's most complete line of fittings in all sizes for wire rope and chain. For complete catalog, write: Thomas Laughlin Division, American Hoist & Derrick Co., St. Paul 1, Minnesota, or Portland, Maine.

SALES AND SERVICE . . .

Continued from page 166

cently. Retiring from the board are Charles Warner, a director since 1927, and Cecil F. Backus, a member of the board since 1929. The new director is Wilfred D. Gillen, president of the Bell Telephone Co. of Penn., and the Diamond State Telephone Co.

Special Mention

Lehigh Portland Cement Co.: The capacity of the Mason City, Iowa, plant will be increased by one million barrels annually, it was announced recently by president Joseph S. Young. The expansion program, which will enable the plant to produce approximately three million barrels yearly, is expected to be completed by 1957. Expansion will be carried on without interference with current production.

Pioneer Engineering Works, Inc.: The subsidiary of Poor & Co., Chicago, has purchased the Minneapolis-Moline Power Implement Co. plant and an adjoining plant in Minneapolis, Minn. The acquisition will enable Pioneer to more than double facilities at its present location.

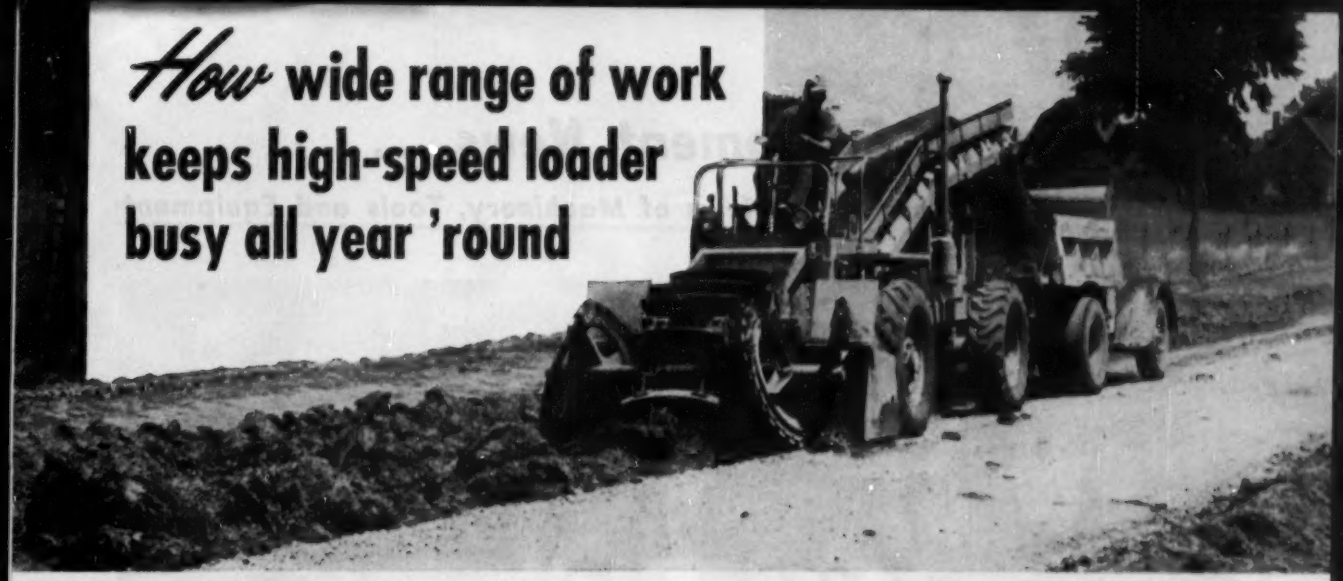
Clark Equipment Co: The Construction Machinery Div. plant at Benton Harbor will be enlarged 50% with the construction of a new 125,000-sq ft addition. The original plant, opened a year ago, was designed specifically for the manufacturer of the Michigan line of tractor shovels, excavator cranes and dozers. The Construction Machinery Div. sales for 1955 were estimated at $32 million, according to Clarence E. Killebrew, vice-president in charge of the division.

Goodall Rubber Co.: A new branch office and warehouse have been opened at Kansas City, Mo., to handle stocks of contractor's industrial rubber products including hose, belting, and waterproof footwear and clothing.

Association Activities

Asphalt Institute: A poll of 72 directors of the Asphalt Institute revealed that no acute shortage of paving asphalt is expected in 1956. The poll was taken at the annual two-day board meeting held in New York City during December. The directors, representing various segments of the petroleum industry, found that member firms are geared to meet any production challenge offered by the anticipated Federal highway program this year. At the New York meeting the membership application of the Sun Oil Co. and the Richfield Oil Corp. were approved.

How wide range of work keeps high-speed loader busy all year 'round



Here is a heavy-duty, self-propelled, belt-type loader having a wide range of applications for highway departments. It loads practically any type of loose material out of windrows or stockpiles. In addition to high loading capacity, it gets around fast from job-to-job.

Use Adams TraveLoader for picking up surplus material on road and street construction or reconstruction. Use it for loading materials out of borrow pits and stockpiles. TraveLoader works fast in dirt, sod, sand, gravel, crushed stone, slag, cinders, snow. It loads topsoil for landscaping with no prior preparation.

How it works

TraveLoader loads in any one of a wide range of 5 working speeds from 0.29 to 1.9; has 5 travel speeds from 3.90 to 26.7. The floating, revolving, screw-type feeder automatically adapts its speed to the load ahead and places a continuous flow of material on the conveyor-belt. Trucks can be loaded with loose materials at up to 10 yards per minute. Travel speed range makes it easy to keep TraveLoader working to capacity. Trucks load behind loader, do not interfere with passing traffic. Moves job-to-job over highways and city streets at speeds to 26.7 mph.

Heavy, durable construction

All-welded, box-construction, one-piece frame extends full length of machine. Heavy-duty front and rear axles, sturdy feeder mechanism, rigid conveyor with sealed-for-life roller bearings, give TraveLoader the necessary strength to handle heavy loads at fast speeds with minimum downtime and maintenance. *Available with gasoline or diesel engines.*

Easy to operate

You will like TraveLoader's centrally-located control station . . . up out of the dust, permitting clear vision in all directions. Easy, fast, hydraulic controls, give quick adaptability to any working condition.

Get all the facts on the Adams TraveLoader from your LeTourneau-Westinghouse Distributor.

On this road-widening job, surplus materials are loaded from windrow into truck in a matter of seconds. No traffic interference.

Side-shiftable cross conveyor (optional) loads trucks on either side of machine, assures proper balancing of load. A great time-saver in materials yards. Conveyor position power-controlled from operator's cab.

Cities have many uses for TraveLoader. For instance, ice and snow on city streets can be loaded at the rate of 12 to 20 yards per minute. TraveLoader finds work the year 'round.

Here a contractor cuts and loads gravel out of a natural bank. Many contractors and highway departments use TraveLoader for loading stockpiled materials of all kinds.

AL-5-G-b

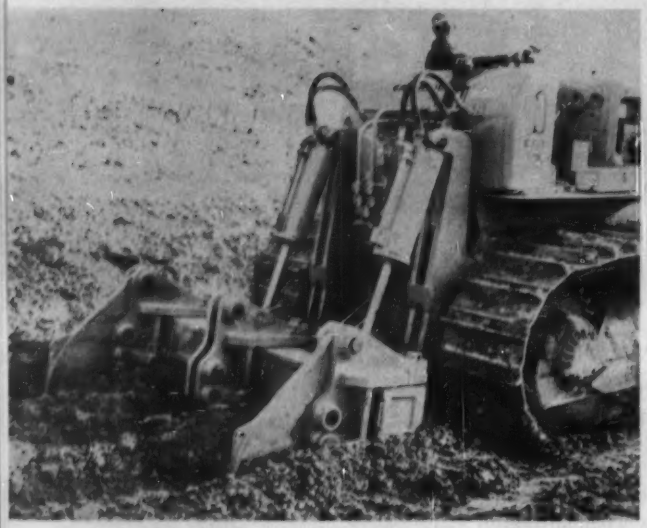
LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

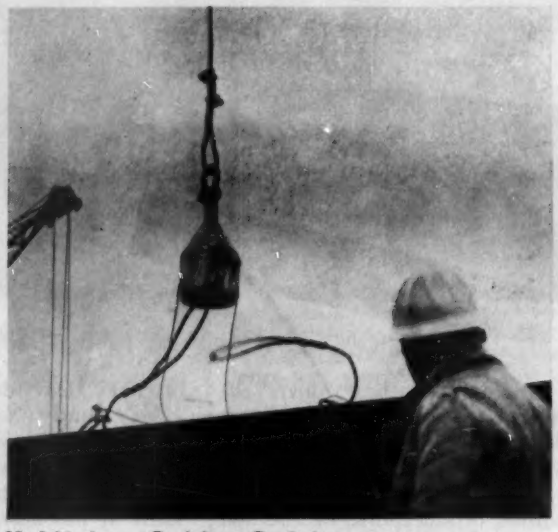
Construction Equipment News . . .

On-the-job previews of Machinery, Tools and Equipment



Ripper Weighs 6½ Tons

The heavy duty Ateco HRD9 rock ripper is designed specifically for the Caterpillar D9 tractor. Weighing over 6½ tons, it has a maximum ripping depth of 26 in. with standard ripper shanks, and up to 48 in. with subsoiler shanks. Curved ripper shanks, with replaceable points, produce quivering action that helps break up soil.—**American Tractor Equipment Corp., 9131 San Leandro Blvd., Oakland 3, Calif.**



Unhitches Cables Safely

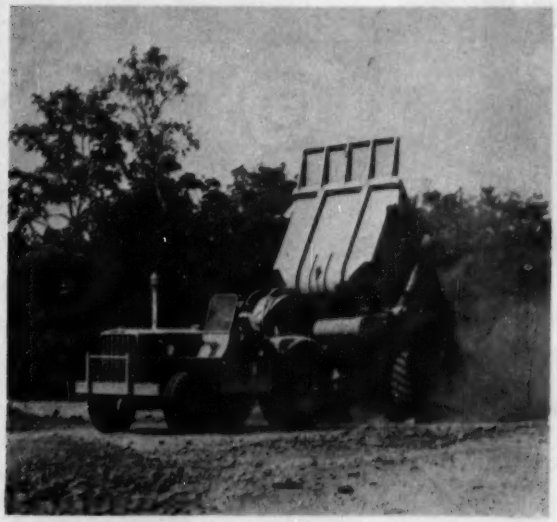
A new safety trip shackle does away with one of the most dangerous jobs in structural steel work—walking to the center of the girder to unhitch a cable after it has been positioned. Called the Mighty Ben, the shackle lets a rigger release a girder by pulling a trip line from the end of the girder or from the ground. Various sizes cost from $400 to $1,000.—**Bennet, Ervin, Nicholas, Inc., Cleveland, Ohio.**

Loads Other Trucks Also

The Holmes-Owen truck loader has a forward-tipping bucket that permits it to load other trucks as well as the truck that it is mounted on. The loader, easily installed on most 1½ or 2-ton dump trucks, has a ½-yd capacity. Bucket has a pivot at each end mounted in bearings that allow the bucket to rotate 120 deg. Twin cylinders power the bucket.—**Ernest Holmes Co., Chattanooga, Tenn.**

Changes All Earthmover Tires

A new hydraulic tire changing tool can be used on the job for changing or mounting earthmover tires with a minimum of time and labor. The tool is said to be the only portable hydraulic changer applicable to all makes and designs of earthmoving rims for either conventional tires or Goodyear's new tubeless tires. The changer is called the TO-100.—**Goodyear Tire & Rubber Co., Akron, Ohio.**

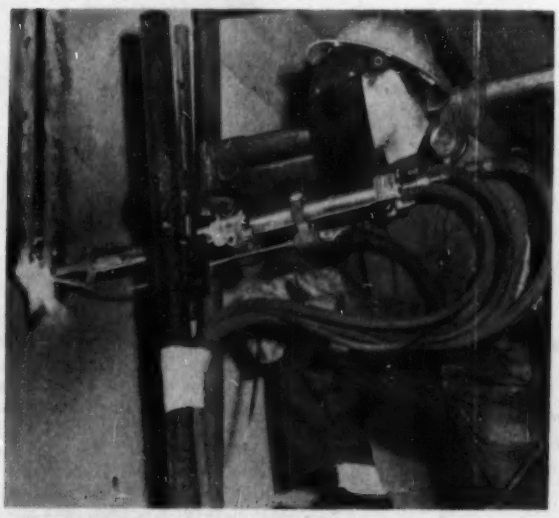


Trailer Dump For DW 15

Athey's new PR 15 rear dump trailer, when combined with Caterpillar's DW 15 tractor, offers a capacity of 15½ yd, speeds up to 31.3 mph. The unit weighs 84,683 lb loaded, with 37% of the weight on the tractor wheels. Three-stage hydraulic hoists tilt the body 60 deg for quick ejection. The welded body is reinforced with box sections. Standard tires are 21:00-25, 24-ply.—**Athey Products Corp., Chicago, Ill.**

On-The-Job Pipe Saw

The Big Guillotine power pipe saw quickly cuts cast iron or steel pipe up to 16 in. dia right on the job. The 312-lb unit is compact enough to cut in a 32-in. ditch. Chain-type pipe vises secure the saw to the pipe at any desired angle. The 22-in. steel blade cuts in 2-in. strokes. It is available with an electric motor or it can be air powered.—**E. H. Wachs Co., 1525 N. Dayton St., Chicago, Ill.**



Powder-Cuts Concrete

When used with Linde's new powder nozzle, a standard powder-cutting blowpipe will cut up thick sections of reinforced concrete. Tested on a demolition job, it cut up 2,928 sq ft of concrete wall ranging from 10 to 18 in. thick into easy-to-handle squares. A metallic powder is added to the oxyacetylene flame to increase temperature for quick cuts.—**Linde Air Products Co., 30 E. 42nd St., New York, N. Y.**

Bucket Arm Swings 180 Degrees

The Speed Swing loader is a valuable rig when close-quarter loading is necessary because the bucket arm swings a full 180 deg, permitting the rig to work without moving it. The Speed Swing also works as a standard front-end loader with a capacity of 5,000 lb. It features 30-deg bucket tilt-up at ground level. —**Pettibone Mulliken Corp., 4700 W. Division St., Chicago 51, Ill.**

(Continued)

NOW! An All New Beaver Quick-Opening Quadra-type Threader

SPECIALLY BUILT FOR POWER-DRIVE USE—NO LEAD SCREW TO JAM OR RESET . . .

★ Threads 1" to 2" with only one set of high-speed dies!

★ Dies are full width, (1⅛")—the same length as a perfect standard thread in the 1" and 2" range!

★ New guide gives instant, perfect alignment without clamping to pipe!

★ Has quick-opening die throw out. When throw out is opened, dies retract. Close handle for next thread; setting remains accurate!

★ Can be set in any position . . . open or closed. Setting marks never vary!

★ Dies are thick to absorb heat; give longer life at lower die cost!

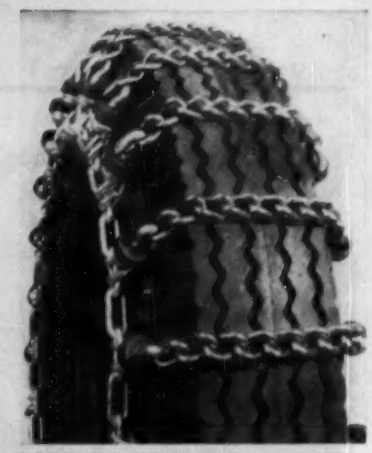
★ Elimination of lead screw saves setting and re-setting time . . . no jamming! Makes operation of any power drive similar to that of a pipe machine!

Write, Wire or Phone for Information

BEAVER PIPE TOOLS

228-400 DANA AVE. • WARREN, O., U. S. A.

"55 Years of Highest Quality"



RUBBER-CUSHIONED CHAINS—Only seconds are needed to install Ruggo tire chains without tools. The chains feature a rubber-roller assembly that acts as a cushion for the chain, and prevents damage to the tire. Resiliency of the rubber roller permits easy removal of the cross-chain, even when on the tire. Because the roller permits the cross-chains to turn freely on the tire, they wear evenly on both sides, thereby prolonging chain life. The chains, which fit any heavy-duty vehicle, are available in two sizes, regular 5/16 in. and extra heavy ⅜ in.—**The Thomas Co., 1645 Hennepin Ave., Minneapolis 7, Minn.**

FACE-SHIELD — A clear acetate visor that gives excellent frontal and side protection against flying particles can be attached to any M-S-A protective hat in sec. An aluminum pivot arm permits the shield to be swiveled up or down in any position. —**Mine Safety Appliances Co., 210 N. Braddock Ave., Pittsburgh, Pa.**

STOPS STALLING—Filt-O-Reg is a combination fuel pressure regulator and fuel filter that helps stop flooding, stalling and vapor lock and makes any gas engine run smoother. It keeps a constant pressure of only 2 psi on the carburetor float valve, thereby maintaining the proper float

Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. At 27 mph, it runs rings around any dozer on the market!

Power-tilting bowl. A powerful double-acting hydraulic cylinder tilts the bowl back and forth through a 33 degree arc. You can change the angle of the bowl from "dig" to "float" as you travel—work the cutting edge back and forth under stumps and boulders to uproot them. Two 6-inch lift cylinders give you tremendous lifting power and down-pressure—you can raise the cutting edge from 24¼ inches below ground level to 43¾ inches above.

High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up"

Full traction while turning. The Turbo-Dozer gives you full tractive effort even in a turn. *All four wheels are always driving,* except when you declutch the rear axle for highway travel. Rear-wheel steering eliminates unnecessary tire wear —you don't brake or drag your inside wheels on a turn. If one wheel begins to slip, a locking differential automatically applies power to the wheel with the firmest footing.

Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two finger-tip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

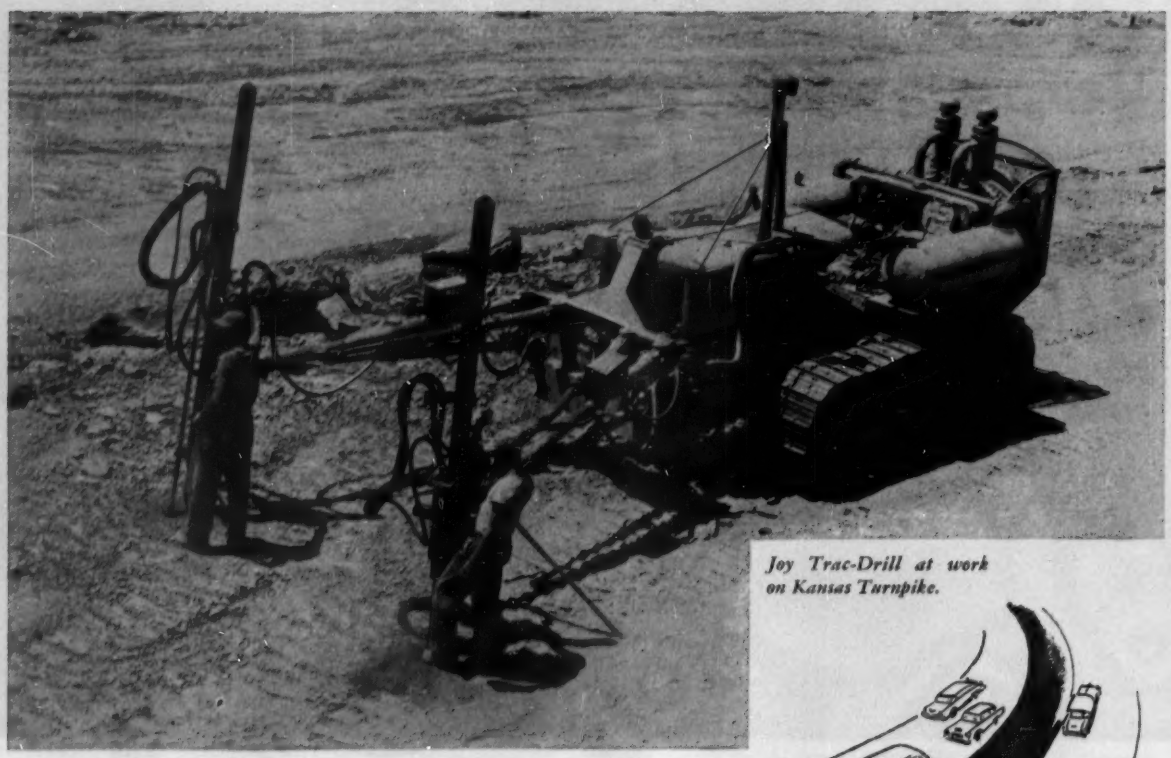
The 3-to-1 Clark torque converter gives you a steady power flow, regardless of speed. As the load gets heavier the torque output automatically increases up to 300% at stall speed—gives you the extra torque to plow through the toughest spots. You can't stall the engine, and there's no clutch to slip.

See the Turbo-Dozer movie. You can see the new Turbo-Dozer working typical jobs in a 20-minute color movie—see how it will give you faster cycles, more yardage or tonnage in every shift. Ask your local Michigan distributor to arrange a showing at your convenience—no obligation, of course. Or write direct: we'll send you a 20-page photo booklet which gives complete details on the new Michigan Turbo-Dozer.

MICHIGAN is a trade-mark of Clark Equipment Co.

CLARK EQUIPMENT

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2403 Pipestone Road
Benton Harbor 35, Michigan



Joy Trac-Drill at work on Kansas Turnpike.

Kansas Turnpike ...another JOY DRILL JOB!

Contrary to popular opinion, Kansas is not completely flat. Evidence: 39.5-million cu. yds. of common excavation and 5.5-million cu. yds. of rock involved on the new Kansas Turnpike job.

. . . And where you find rock, you find Joy equipment. So far, on this 236-mile super-road, seven contractors are using twenty-one Joy drills—shown is one of the Joy *Trac-Drills* at work.

A self-contained drilling machine (one vehicle mounts everything), the *Trac-Drill* carries two Joy drills on twin Joy *Hydro Drill Jibs* (hydraulically actuated booms with power lift and power swing), and a complete Joy air compressor installation. The *Trac-Drill* goes anywhere a tractor goes—there's nothing to tow.

The variety of other Joy drills and mountings on the Kansas Turnpike project points up the versatility and scope of the most complete rock drill line on the market. If there's drilling in *your* contract, better put Joy on the job.

For further information, write ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Write for FREE Bulletin 38-23

Consult a Joy Engineer

for AIR COMPRESSORS • ROCK DRILLS • WAGON DRILLS
CORE DRILLS • BLAST HOLE DRILLS • PORTABLE HOISTS • FANS
BLOWERS • TUNNEL, QUARRY, MINE EQUIPMENT

WSW CS611-39

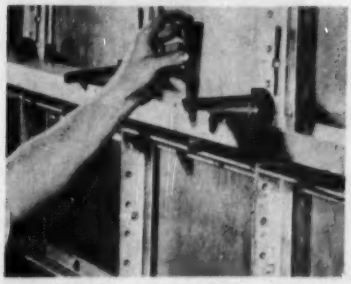
JOY

CONSTRUCTION EQUIPMENT MANUFACTURERS
FOR OVER HALF A CENTURY

EQUIPMENT NEWS . . .

Continued from page 174

level under all driving conditions. Engine fuel enters the Filt-O-Reg with jerky pulsations under full fuel pump pressure. The gas flows through a micro-filter element and then passes around the free-floating valve into the carburetor. As soon as the fuel pressure against the carburetor float valve reaches 2 lb, the Filt-O-Reg starts to reduce and regulate the excessive pressure from the fuel pump. As the gas level drops, the float valve opens and pressure is reduced under the diaphragm to open the valve and allow a free flow of fuel. Standard model sells for $7.95.—**Alondra Sales, Inc., Los Angeles, Calif.**



FOR FORM PANELS—A new liner clamp that attaches alignment lumber directly to Uni-Form concrete form panels eliminates wooden wedges, nails and liner hooks, and permits one man to quickly align forms. Called Liner-Loc, the clamp is a malleable iron casting with a steel wedge that can be reused indefinitely. The clamp is attached to the panel frame and the alignment lumber is set in place. Then the upper arm of the clamp is swung in place and a steel wedge is inserted in the arm loops. Tapping the wedge down tightens the lumber against the panels and brings the form in line.—**Universal Form Clamp Co., 1238 N. Kostner Ave., Chicago 51, Ill.**

75,000 BTU SALAMANDER—Operated on liquefied petroleum gas, the model 750 Hi-Heat salamander is rated at 75,000 Btu-per-hr normal output. An efficient heat shield deflects heat along the floor and eliminates the hot spot often found under salamanders.—**Jackson Manufacturing Co., Harrisburg, Pa.**

Safe, smooth pipelaying on Pittsburgh utilities job—by Cleveland "80W."

Same job—same day—same "80W"—backfilling and tamping.

PIPELAYING, BACKFILLING and trench compaction, too, where needed—*each* done expertly by the Cleveland "80W." This modern machine substantially reduces equipment and manpower requirements on underground construction jobs of all types. That's why so many users equip *each* of their crews with a versatile "80W." Check its *complete* performance features—see how it fits your program—put it to work for you. You'll be money ahead when you do.

See your local distributor

THE CLEVELAND TRENCHER COMPANY • 20100 St. Clair Ave., Cleveland 17, Ohio

CLEVELAND

PORTABLE CRUSHER — A new portable crushing and screening plant for use in the intermediate crushing stage of gravel and rock has been added to the Pioneer line. The plant, called the 120 JS, consists of a 4x8-ft, two deck Mesabi-type vibrating screen mounted ahead of a jaw crusher, and two delivery conveyors. It is designed to be used between a primary and a secondary crusher to increase production by allowing for smaller stages of reduction. The plant features a secondary spring suspension of the vibrating screen that reduces the transfer of screen vibration from the frame to the plant itself. The screen, with ⅜-in. throw and a 10-deg slope, is powered by a 7½-hp, 1800-rpm electric motor. The overhead jaw crusher needs 70-90 hp, continuous duty, at 1,200 rpm. The end delivery conveyor is 30 in. x 20½ ft. It is powered by a 5-hp motor. The side delivery sand conveyor from the fines hopper is 24 in. x 8 ft. and has a 3-hp motor. The unit is mounted on a channel frame, rear axle trailer with 12 pneumatic tires and stabilizer jacks under the main frame.—**Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis 13, Minn.**

WISCONSIN HEAVY-DUTY Air-Cooled ENGINES

Single cylinder 2.3 to 6.8 hp.

Offer the Most Complete Power Selectivity to Fit the Job and the Machine

Because Wisconsin Air-Cooled Engines are supplied in a complete power range, from 3 to 36 hp., in 4-cycle single cylinder, 2- and 4-cylinder types and sizes, there is an ideal size to fit a great variety of construction equipment applications, with maximum power advantage, greatest economy and low-cost maintenance.

Single cylinder 6 to 9 hp.

Every Wisconsin Engine, from the smallest to the largest, is of heavy-duty design and construction, with the built-in Lugging Power that hangs on through the shock-load pinches as well as standing up under continuous, constant load service.

All models are equipped with tapered roller bearings at BOTH ends of the crankshaft, taking up both radial- and end-thrusts — permitting safe mounting of drive pulley, gear or sprocket directly on the extended crankshaft, with utmost protection against bearing failure.

2-cylinder 7 to 15 hp.

All models are furnished with rotary type, high tension OUTSIDE Magneto, with Impulse Coupling for quick easy starts in any weather, at low cranking speeds.

All models have pump-circulated, positive lubrication systems and foolproof AIR-COOLING at its best.

V-type 4-cylinder 15 to 36 hp.

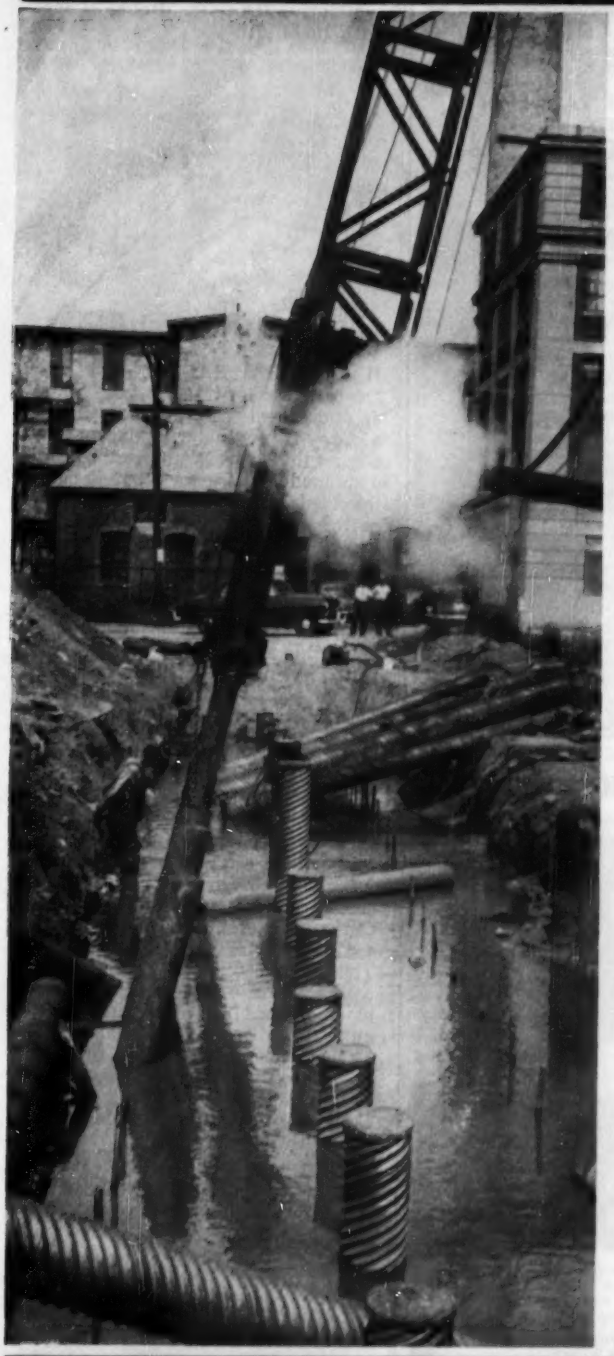
You can't do better than to specify "WISCONSIN POWER" for your equipment.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

SMALL MELTING POT — A new thermostatically controlled electric melting pot will handle small quantities of asphalts, tars, pitches, and resins at exactly the right temperature for the material being processed. Its portability makes it ideal for maintenance jobs where only small volumes of materials have to be heated. Its capacity is 3 gal. Fiberglas insulation is used in the heating chamber, and the outside housing is 20-gage aluminum. The $75 melting pot operates from any 115-v outlet. — **Glas-Col Apparatus Co., Inc., 711 Hulman St., Terre Haute, Ind.**

EASY-READING HOUR METER— A direct-reading engine hour meter that is as easy to read as the odometer on an automobile speedometer has been introduced by Hobbs to meet requests of equipment owners who find the usual pointer-type indicator difficult to read. The new meter is a true timing instrument and not a revolution counter. The

Call C. L. GUILD CONSTRUCTION CO.



For Estimates on any Type of Piling Job

- Cast-in-Place
- Wooden Piles
- Composite Piles
- Steel H-Piles
- Pipe Piles
- Steel Sheet Piling

SPECIALISTS IN THE USE OF COBI PILES

Cobi Piles are Better

Cobi Piles will meet required resistance almost invariably at less depth than any other cast-in-place pile. Ask us for comparative load test data.

THERE ARE 7 OTHER REASONS WHY COBI PILES ARE BETTER

1. COBI PILES drive straighter, due to the constant cross section of the heavy mandrel.
2. COBI PILES are more economical, they are driven in intimate contact with the soil and screw themselves into the ground.
3. COBI PILES are cast in forms that are watertight. Every seam and splice is continuously welded.
4. COBI PILES maintain the original shape and forms of the shells. They are driven as an integral part of the mandrel.
5. COBI PILES are largest where the need is greatest, down below.
6. COBI PILES show less settlement under heavy loads.
7. COBI PILES are anchored in the ground, they resist uplift best.

C. L. GUILD CONSTRUCTION CO., INC.

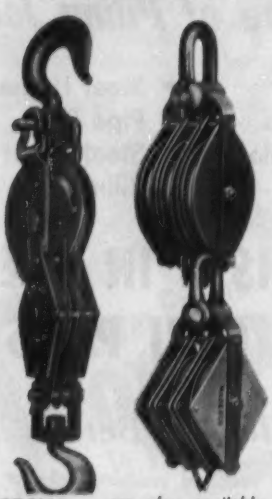
94 Water Street, East Providence, Rhode Island • 347 Madison Avenue, New York 17, N. Y.

EASTERN CONCRETE PILE CO.
80 Boylston St., Boston, Mass.

DIVISIONS

AMERICAN DRILLING COMPANY
92 Water St., E. Providence, R. I.

Correctly engineered to bear heavier loads, lengthen rope-life, reduce maintenance costs



THERE'S A COMPLETE RANGE OF LOAD-RATED

MADESCO BLOCKS

WORTH ASKING FOR—BY NAME

● Because they're engineered and conservatively "load-rated" for specific tasks, you'll find MADESCO blocks with heavy steel shells and fittings your *safest* choice. In design, in materials, in construction, Madesco tackle blocks give you the extra service that comes from over thirty years of specialized experience and "know-how." Buy Madesco blocks and you make substantial savings on your rope costs, because Madesco sheaves (of iron or steel graphite bronze) are precision-grooved to prolong rope-life. Loads travel smoothly, easily, quickly to save lifting time; that means savings too that come from minimized maintenance and down-time. There's a complete line of Madesco tackle blocks—consult your industrial distributor — and meantime write for our catalog.

MADESCO TACKLE BLOCK CO., Easton, Pa.

SPECIAL FORGINGS are also available for varied needs. Write us. Remember too, we quickly furnish special block fittings and replacement sheaves.

Elis **Re-Shoring Methods Assure Economy!**

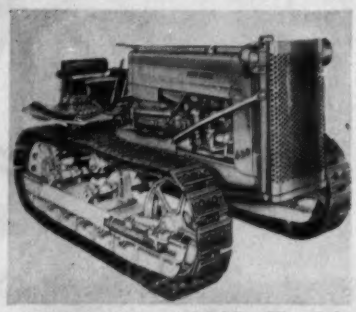
The easiest way — bar none — to re-shore suspended reinforced concrete floors is with ELIS SHORES. Notice how simply it is done!

Builders save time and money with this practical re-shoring method. After Elis adjustable shores are taken down to remove decking, those same shores can be re-erected quickly—no waiting for concrete to set completely—and the forming lumber that was taken out can be used immediately on other parts of the structure. Old fashioned shores (4 x 4's cut, spliced, blocked, and wedged) are too short for re-shores, but Elis Shores adjust to new height quickly. Elis Shores have such a high resistance against buckling that they do not require horizontal bracing, which gets in the workmen's way, as all other types do. Elis Methods are the answer to re-shoring problems!

MFD. BY ELIS EQUIPMENT CO., INC., 211 N. W. 4h ST., OKLAHOMA CITY, OKLA.

EQUIPMENT NEWS . . .Continued

timing mechanism is a ruggedly built electric clock that records the time a vehicle is in operation. Various voltage and mounting styles are available.—**John W. Hobbs Corp., Springfield, Ill.**

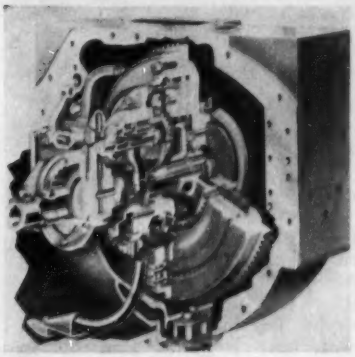


HANDYMAN TRACTOR—The John Deere 420 series tractors, both crawler and wheel-type, are powered by a new two-cylinder, valve-in-head engine that increases power by 20% over model 40 tractors that the new line replaces. It is estimated that the power increase will bring the 4,000-lb tractors near the 30-belt-hp range. Drawbar hp is increased from 20 to 25 hp. The additional power is provided by changes in the bore, cylinder head, valve mechanism, manifold and by 7-1 compression ratio. A new pressurized cooling system with water pump and thermostat replaces the thermo-siphon system formerly used.—**Deere & Co., Moline, Ill.**

HORSEPOWER INCREASED—LeTourneau-Westinghouse has made a number of changes in engines and horsepower ratings in their line of Adams motor graders. The Adams 660, formerly powered by a 140-hp Cummins diesel, is now powered by a Cummins or GM 150-hp engine. The model 550 is now equipped with a 123-hp GM or Cummins engine in place of the 115-hp International engine that formerly powered the rig. The 440, formerly powered by a 100-hp International engine, is now offered with a 104-hp GM or a 100-hp Cummins engine. The 330 may be had with an International 75-hp engine or a 80-hp Cummins or GM engine. — **LeTourneau-Westinghouse Co., Peoria, Ill.**

RUGGED MACK TRUCKS—Mack Truck Co. engineers are calling the new B-80 line the most rugged Macks of their size ever built. Designed especially for heavy off-high-

way jobs, the 11 new models range in gvw from 46,000 lb for the four-wheel trucks to 65,000 for the six-wheelers. They feature large section, heat-treated alloy steel frames that are double-channeled from end to end. All models have exposed radiators with bolted top and bottom tanks and extra strength flat top fenders that can be used as working platforms. A choice of gasoline or diesel engines, ranging from 170 to 300 hp, including the new Mack Thermodyne turbocharged diesel, are available. A broad choice of wheelbases and gear ratios are offered.—**Mack Trucks, Inc., 350 Fifth Ave., New York, N.Y.**



NEW OIL CLUTCH—The new D4 oil clutch is similar in design to the clutches used on the D6, D7, D8 and D9 Caterpillar tractors. It features metallic-faced clutch disks, a self-contained gear-type pump and oil supply and a clutch brake for easy shifting. There is little opportunity for overheating to occur, since the three metallic-faced plates on the new clutch are separated by oil films at all times except for the revolution or two as the clutch is engaged. —**Caterpillar Tractor Co., Peoria, Ill.**

FOR TRANSPORTING BRICKS—The American Brick Hop is a cart on wheels that can be loaded, hoisted to the scaffold and then easily moved around. Light in weight, the Brick Hop features sturdy construction and a simplified hydraulic lift system. The Full Pallet model 5591 will carry a pallet up to 32x32 in. with a capacity of 1,500 lb. The hydraulic lift, with automatic tilt back, has a maximum lift of 16 in. at the tip of the fork, 7 in. at the

Here's how Blackhawk design speeds up jacking jobs

ONE MAN on a short handle quickly applies vast lifting tonnage. Above — two 50-ton **Blackhawk** Hydraulic Jacks supply precision raising and lowering to 1/1000 of an inch — promoting efficiency, safety and speed.

"Lightning Lift" —Exclusive double pump construction for quick load contact and easy power lifting.

More Efficient! One-man operated Blackhawk Hydraulic Jacks are 94% efficient as compared with only 12 to 30% efficiency for mechanical jacks.

Easily Carried by One Man! Compact, lightweight Blackhawk jacks are easy to position in tight spots.

Exclusive design features prevent damage—eliminate costly delays on the job. Avoid many expensive repairs to jacks.

More ease, too! This combination of big exclusive features is a sure key to less effort plus greater speed and better workmanship on jacking jobs. They are some of the reasons why Blackhawk Hydraulic Jacks are so superior.

You also have extra utility — by attaching a gauge (do it yourself easily) to test, weigh, etc. And Blackhawk Jacks last longer and are so trouble-free because they are fortified with exclusive design features proven by 27 years of field experience. Get Blackhawk Jacks (at new low prices) from leading supply houses.

Bank on Blackhawk for the **MOST COMPLETE LINE OF HYDRAULIC JACKS ...1½ to 100 Tons**

BLACKHAWK®

WORLD'S LARGEST MANUFACTURER OF HYDRAULIC TOOLS

BLACKHAWK MFG. CO., J-2316, Milwaukee 46, Wis.

(Advertisement)

NINTH IN A SERIES OF ARTICLES ON COMMON MAINTENANCE PROBLEMS

IS POOR LUBRICATION REDUCING THE LIFE OF YOUR AXLES

TRANSMISSIONS — FINAL DRIVES?

A large contractor clearing a swamp asked us to investigate the cause of numerous axle failures in his off-highway trucks. Samples of used lubricant were taken from each rear end and tested in our laboratories. The results showed a large percentage of water present in the gear lubricant of certain units. In these particular units, the water had reduced the film strength of the lubricant to permit excessive wear of gear teeth. The large quantity of tiny particles in the lubricant acted as a grinding compound causing premature failure. All units containing water were drained, flushed and refilled with new lubricant. Periodically samples of the used lubricant were taken to determine if contamination and wear had occurred. With this test program, the contractor experienced no further failures.

Poor lubrication of transmissions, final drives and axles, is the most common cause of failures. If an oil has insufficient film strength, scoring, scuffing and high wear will develop on the gear tooth surfaces. The film strength of even good quality oils can be lost by use over too long an interval between changes.

Foaming has always been a factor in many gear failures due to the lack of a continuous oil film permitting metal to metal contact. If excessive foaming occurs in gear cases without air vents, a buildup of pressure can blow seals and gaskets causing loss of lubricant.

Poor quality oils will thicken in service causing gummy and varnish deposits which prevent proper cooling of gear unit. Oxidation has caused some lubricants to become so heavy in service, it was impossible to drain lubricant from gear case when cold. In such instances it was necessary to heat lubricant, then flush gear case and refill with new lubricant.

The proper viscosity of a gear lubricant is very important. It should be heavy enough to prevent metal to metal contact and provide a cushioning effect at points of contact. It should be light enough to be fluid at all prevailing temperatures to prevent channelling. It must also pass through filters satisfactorily when they are present.

Mixing of E.P. Lubricants in the same gear case is undesirable because a chemical reaction can develop causing precipitates and loss of film strength.

For 35 years the D-A Lubricant Company has been solving problems of equipment owners, and offering personalized service—including complete laboratory analyses where required. This added service, combined with D-A's quality products designed especially for the heavy-duty field, provides the best protection you can have against costly breakdowns and parts bills.

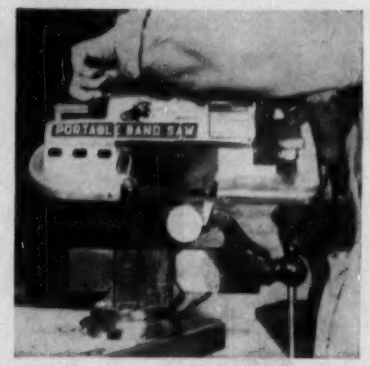
If you feel poor lubrication is reducing the life of your heavy duty gear cases, why not talk it over with the D-A representative in your area.

D-A LUBRICANT COMPANY, INC.
Indianapolis 23, Indiana

SPECIALISTS IN HEAVY-DUTY LUBRICATION SINCE 1923

EQUIPMENT NEWS . . . Continued

base. It is 60 in. long, 48 in. wide and 39 in. high. Front wheels, mounted with pneumatic tires, are equipped with hand friction brakes. The Half Pallet model 5592 will handle loads up to 1,000 lb with dimensions up to 16x32 in. It is 59 in. long, 33 in. wide and 39 in. high.—**American Road Equipment Co., Omaha, Nebraska.**



HIGH-SPEED BLADE — Stainless steel, carbon tool steel, nickel, and other hard metals may be cut faster with a new high-speed steel blade that fits Porter Cable's Porta-Band saw. The new blade, available in 6, 9, 12 and 16 teeth-per-in. sizes, is only .02 in. thick. A simple blade changing device makes it possible to remove and insert the blade in the Porta-Band saw in a min.—**Porter-Cable Machine Co, 59 Exchange St., Syracuse 8, N. Y.**

MOBILE SHANTY—This new mobile storage trailer, designed to take the place of equipment shanties and storage rooms, sells for only $900. With over 100 sq ft. of floor area and 668 cu ft of storage space, it needs little maintenance, offers good insulation and mobility. The trailer has a metal exterior with three windows. —**International Trailer Co., Inc., 5712 Erdman Ave., Baltimore 5, Md.**

DEEP-HOLE DRILLING — Longer shanks that permit deep-hole and through-drilling in concrete are a feature of the 24 new carbide-tipped masonry drills recently added to the Carboloy line. The new drills have butt-welded shanks of 12 to 18 in. with diameters ranging from ¼ to 1½ in.—**Carboloy Dept., General Electric Co., Detroit 32, Mich.**

(Continued on page 185)

Twin Disc Torque Converter on shovel increases cable life over 100%!

Records of Zontelli Brothers, of Ironton, Minn., owners of the JoAnn Iron Mine, show replacement of *seven sets* of cable on a shovel equipped with straight mechanical drive — while replacing only *three* sets on one driving through a Twin Disc Torque Converter . . . a substantial reduction in down time, *plus* increased cable life of *over 100%*.

According to Al Fox, Master Mechanic, "considering the cost of down time in replacing cables — plus the cost of cable itself and the actual labor involved in replacing them, the Twin Disc Torque Converter saves us a lot of money."

Both these Model 54-B Bucyrus-Erie 2½-yd. shovels are used to load trucks with iron ore from the open pit mine, where it is then hauled to the washing and crushing plant and processed. One shovel is powered by a diesel engine, with direct mechanical drive—and the other is equipped with a Caterpillar D337 Diesel, working through a Twin Disc Model CF Torque Converter.

In over-all comparisons, the torque converter-equipped shovel increases production, consumes less fuel, and substantially reduces maintenance costs wherever it is used.

For *automatic* matching to load demands, with torque multiplication up to *six times* . . . for cushioning *out* overloads, shock loads and vibrations . . . *specify* Twin Disc Torque Converters for *your* shovels. *Increase* production and cable life — *reduce* fuel and maintenance costs. *Get all the facts.* Write *today* to Twin Disc Clutch Company, Hydraulic Division, Rockford, Illinois. Request Torque Converter Bulletin 135-D.

This Model 54-B Bucyrus-Erie 2½-yd. shovel — powered by Caterpillar D337 Diesel Engine, driving through a Twin Disc Model CF Torque Converter—is loading ore from the JoAnn Iron Mine, owned by Zontelli Brothers, Ironton, Minn.

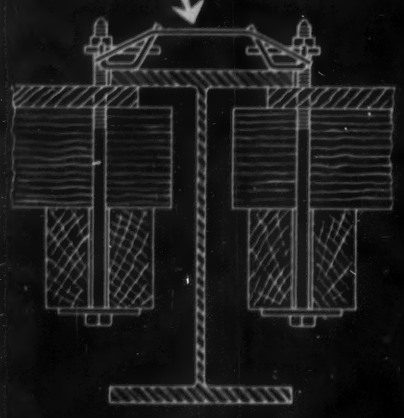
TWIN DISC

TWIN DISC

Torque Converters

BRANCHES OR SALES ENGINEERING OFFICES: CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEWARK • NEW ORLEANS • TULSA

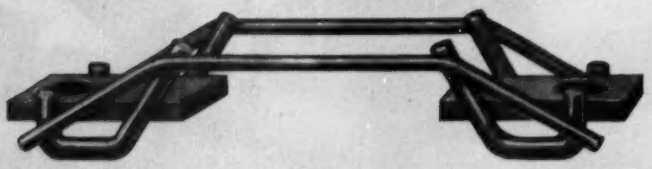
Faster Adjustment from TOP of Deck



TOTAL SAFE LOAD ON BOTH COIL BOLTS IS 10,000 LBS., OR 5,000 LBS. PER BOLT

..WHEN HANGING FORMS WITH

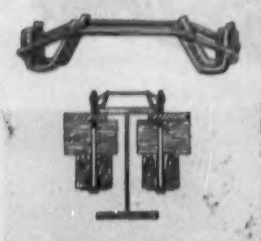
SUPERIOR PLATE HANGER FRAMES



With Superior Plate Hanger Frames the installation and necessary adjustment to bring the deck forms tight against the flange are from *above* the deck. Coil Bolts are passed through and secured from above with coil nuts. Bolts are easily removed without binding because, (1) nuts are square and will not turn; (2) embedment of the bolts in the concrete is at a minimum since the plate is only ½" above the flange.

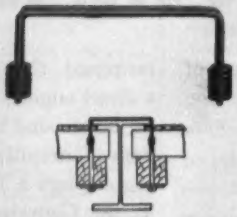
FOUR OTHER SUPERIOR WAYS TO HANG FORMS FROM STEEL BEAMS AND GIRDERS ON BRIDGE SUPERSTRUCTURES

STANDARD COIL HANGER FRAME



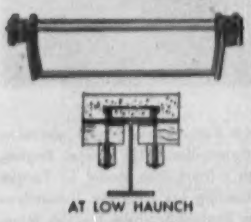
When hanging forms where specifications do not permit any hanger wire to be exposed after stripping, use Superior *Standard* Hanger Frames. Detail at left shows their use with double ledgers, ½" coil bolts, and flat washers. Total safe load on both bolts for Type 10M is 10,000 lbs., or 5,000 lbs. per bolt. For Type 6M, total safe load on both bolts is 6,000 lbs., or 3,000 lbs. per bolt.

COIL BEAM SADDLE



On jobs where hanger wires may be cut after stripping the forms, use Superior Coil Beam Saddles. The Coil Bolts allow for any variation in lumber and flange thickness and tightening the bolts pulls the forms tightly against the flanges. Forms are easily stripped. Safe load is 6,000 lbs. per saddle, or 3,000 lbs. for each ½" Coil Bolt. Coil Beam Saddles are also furnished for ¾" and 1" bolts.

SPECIAL HANGER FRAME

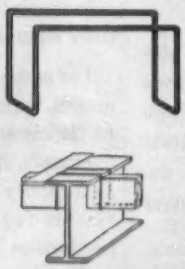


AT LOW HAUNCH

AT HIGH HAUNCH

The design of certain bridge superstructures allows for the permanent deflection of the beams or girders due to the pre-calculated dead load. This deflection is compensated by a concrete haunch of varying depth on the upper flange. Superior *Special* Coil Hanger Frames were developed to meet this field condition, at the same time avoiding any exposed hanger wire. The extent to which the ½" coil Bolts are threaded into the coils allows for these varying haunch depths from maximum to zero. (See detail). Total safe load per frame is 10,000 lbs., or 5,000 lbs. per ½" bolt.

WIRE BEAM SADDLE



Wire Beam Saddles are used to hang centering joists from structural steel beams when the beams are not fireproofed with concrete. On non-fireproofed structures the load is determined by the allowable spacing of centering joists rather than the capacity of the hanger. Available in three gauges and sizes as required. Will carry safely, total loads of 2,500 lbs. to 6,000 lbs. Layouts and estimates will be sent upon receipt of plans or quantities. No obligation.

WORKING PARTS (Bolts and washers) are returnable. Layouts and estimates for Superior Hangers are available without obligation.

SUPERIOR CONCRETE ACCESSORIES, INC.

4110 Wrightwood Avenue, Chicago 39, Illinois

New York Office
1775 Broadway, New York 19, N. Y.

Pacific Coast Plant
2100 Williams St. San Leandro, Calif.

EQUIPMENT NEWS . . .

Continued from page 182

STUDEBAKER PICKUPS — The largest payload capacity in Studebaker history has been achieved in the light-duty Transtar line by increasing the gross vehicle weights by as much as 700 lb, according to the company. In addition, the pickup models have been redesigned to give 51¼ in. wide clear-floor space, said to be the widest in the industry. Wheelbases of 112, 112, 131 in. are available with gvw ranging from 4,800 lb in the ½-ton model to 9,600 lb in the one-ton model. Four engines with hp ratings ranging from 92 to 156 hp. are available. The heavy-duty line, with gvw range of from 14,000, to 16,000 lb, includes 131-, 155-, and 171-in. wheelbase models. Both the 1½- and 2-ton models use a 256.6 cu in., 156-hp engine. A more powerful 175-hp engine is available for the two-ton model. Twelve-volt electrical systems, electric shifting with two-speed rear axle, and larger capacity brakes and springs are other features of the Transtar line.—**Studebaker-Packard Corp., South Bend, Ind.**

AIR-POWERED LIGHT—A unique 150-w, 12-v floodlight is powered by compressed air turbo-generators and cooled by exhaust air. The 22-lb semi-portable lamp draws 23 cu ft of air per min at pressures ranging from 60 to 100 psi. Special reducing valves keep power constant regardless of variations in the unit's primary air supply. An automatic turbine cut-off ensures safety if the blast-proof lens is shattered by external impact. Filter prevents foreign matters from entering generator.—**Copco Eastern Ltd., 380 Madison Ave., New York, N.Y.**

(Contnued on next page)

No time lost

Hartford moved fast to replace our wrecked dragline

(Based on Company File #HS44129)

The driver hauling our dragline didn't have much choice when the air brakes on his tractor-trailer failed on a steep downgrade.

Should he go off the road—and risk plunging over the embankment? Or jack-knife truck and trailer and take his chances?

He decided to jack-knife. The chains holding the dragline to the lowboy snapped. Off went the rig, crashing heavily on its side. Fortunately, our man came through okay.

And, I might add, so did our Hartford Fire Insurance Company Agent. But in another way, of course. *He didn't let any grass grow under his feet in arranging for settlement of our claim.* With his help, the actual amount of damage was quickly agreed on — and a check promptly given us for $5,450!

On the job . . . off the job . . . in transit . . .

You never know where an unforeseen accident may overtake your equipment.

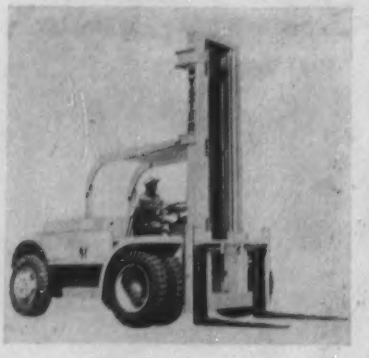
But you *can* know where prompt help is coming from! Hartford is set up to save you costly time losses. You know how they can mount up!

So play safe. See your Hartford Fire Insurance Company Agent or your insurance broker now. And have prompt, satisfying *Hartford* help on tap when you need it!

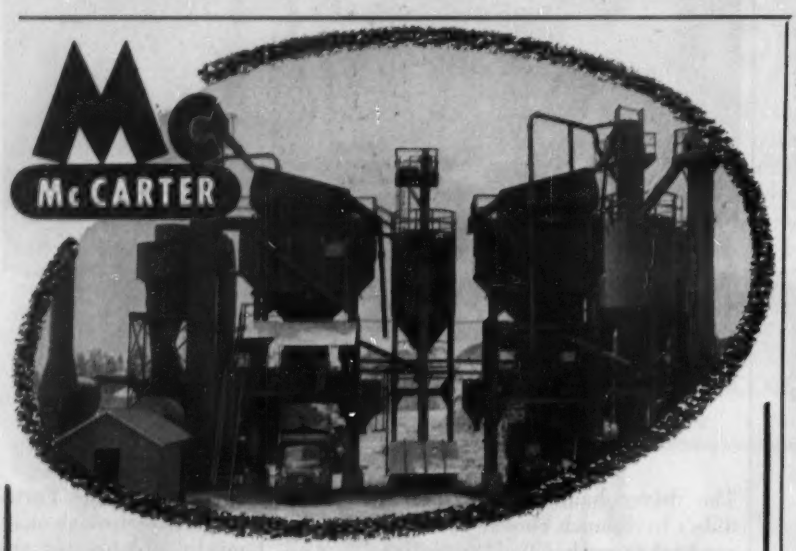
Year in and year out you'll do well with the

Hartford

Hartford Fire Insurance Company
Hartford Accident and Indemnity Company
Hartford Live Stock Insurance Company
Citizens Insurance Company of New Jersey . . . *Hartford 15, Connecticut*
New York Underwriters Insurance Company . . . *New York 38, New York*
Northwestern Fire & Marine Insurance Company
Twin City Fire Insurance Company . . . *Minneapolis 2, Minnesota*



BIG BUT MANEUVERABLE—A compact lift truck with a 20,000-lb capacity at 24-in. load centers offers good stability and rigidity under big loads because of Hyster's overhead tilting mechanism and heavy-duty uprights. Called the TC-200, it has a travel speed of more than 20 mph in either direction. Center-point steering and sharp outside turning radius of only 179 in. create maneuverability. It is powered by a Hercules gas engine or a Perkins diesel. Over-all compactness of the truck is characterized by its 166½ in. length and 94 in. width. It is equipped with 9:00x20, 12-ply tires with lug treads. **—Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ohio.**



ASPHALT MIXING PLANTS
2000 TO 6000 LB. CAPACITY

20 years experience in design and manufacture of this truly balanced equipment, assures McCarter customers of standardized parts and minimum costs.

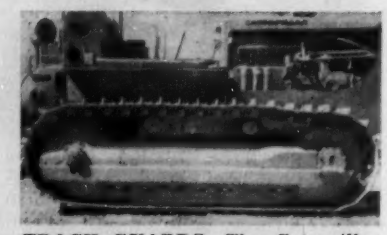
McCarter standard plants — designed and manufactured in their own works are readily adaptable to your special requirements. Individual units also available.

DRYERS (hot or hot & cold material, center outlet type) • MIXERS • ASPHALT BUCKETS (Steam, hot oil or electric heated) • AGGREGATE HOPPERS • BINS • APRON TYPE FEEDERS • CYCLONE COLLECTORS • ELEVATORS • STEEL STRUCTURES

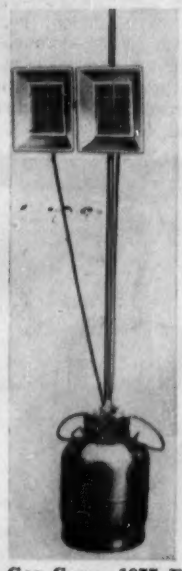
Our Sales Engineers will gladly consult with you!

REPAIRING AND REMODELING OLD PLANTS—A SPECIALTY

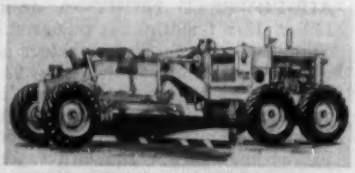
Mc McCARTER IRON WORKS, INC. Norristown, Pa.



TRACK GUARDS—The Caterpillar D8 tractor now comes with track guiding guards that keep idlers and sprockets free of debris and guide the track on to the rollers and sprocket. Formerly, the guards were listed as optional equipment. The guards consist of three heavy plates welded to the underside of each track roller frame. A guide is located on each side of the idler and on the outer side of the sprocket. The guards are especially practical when the tractor is used for hillside operations. A new heavy-duty track roller guard attachment replaces the one presently listed for the D8.— **Caterpillar Tractor Co., Peoria, Ill.**



INFRA-RED HEATER — The Model 1420 Insto-Hot Infra-red heater consists of a ceramic catalyst contained in an aluminum reflector. It is attached to a bracket that fastens directly to a 20-lb. gas cylinder. The heater is said to produce short-wave infra-red heat in large quantities with low fuel consumption. An adjustable mast elevates the heating unit up to 7-ft from the ground. **— Insto-Gas Corp., 1977 E. Woodbridge, Detroit 7, Mich.**



NEW GALION GRADERS—Galion, which recently introduced the T-700 (see Dec. CM&E), the world's heaviest grader, has two new models on the market. Both the 125-hp T-500 and the 140-hp T-600 (above) feature Grade-O-Matic drive, which utilizes a torque converter and power-shift transmission. The manufac-

THE BUFFALO-SPRINGFIELD K-45 KOMPACTOR

How to select compaction equipment

The logical question to ask yourself when you are ready to buy new compaction equipment is: "Exactly what do I need the equipment for and how will I use it?"

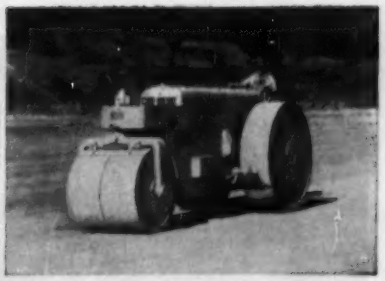
BASE FILL COMPACTION—This type of compaction demands equipment that will handle a wide variety of materials, give you the highest degree of compaction with the fewest passes. Buffalo-Springfield's revolutionary K-45 Kompactor is proving a real money-making answer for this type of work. It is self-propelled, relies on the "Interrupted Pressure Principle." All compaction effort is directed downward. Contractors testify they are meeting density requirements in one-fourth the time normally required with other compaction equipment.

FINE GRADE FINISHING—Buffalo-Springfield offers six 3-wheel rollers, ranging in capacity from 5 to 15 tons, to handle the large variety of materials found in fills, subgrades and unfinished bituminous pavements. The variable-weight 3-wheel roller is ruggedly built for years and years of hard, maintenance-free work.

Buffalo-Springfield's thoroughly-proved 3-axle tandem "walking beam" roller provides up to 60% greater tonnage compacted per day in superhighway construction, airport and military establishment jobs where specifications are extra strict.

ASPHALT FINISHING—Two-axle Tandem Rollers are designed especially for all surface finishing jobs. Ranging from 5 to 16 tons, Buffalo-Springfield Tandems are used for

THE BUFFALO-SPRINGFIELD KX-3 AXLE TANDEM



3-WHEEL ROLLERS

heavy-duty highway and public works projects, and all types of finishing, maintenance and repair work. A wide selection of models for the biggest to the smallest jobs are designed for long-life and profitable operation.

TWO AXLE TANDEMS

SHORT ROLLING JOBS—Buffalo-Springfield's 3-5 ton portable roller is widely used for rolling driveways, sidewalks, parking and playground areas, and for patching and light fin-

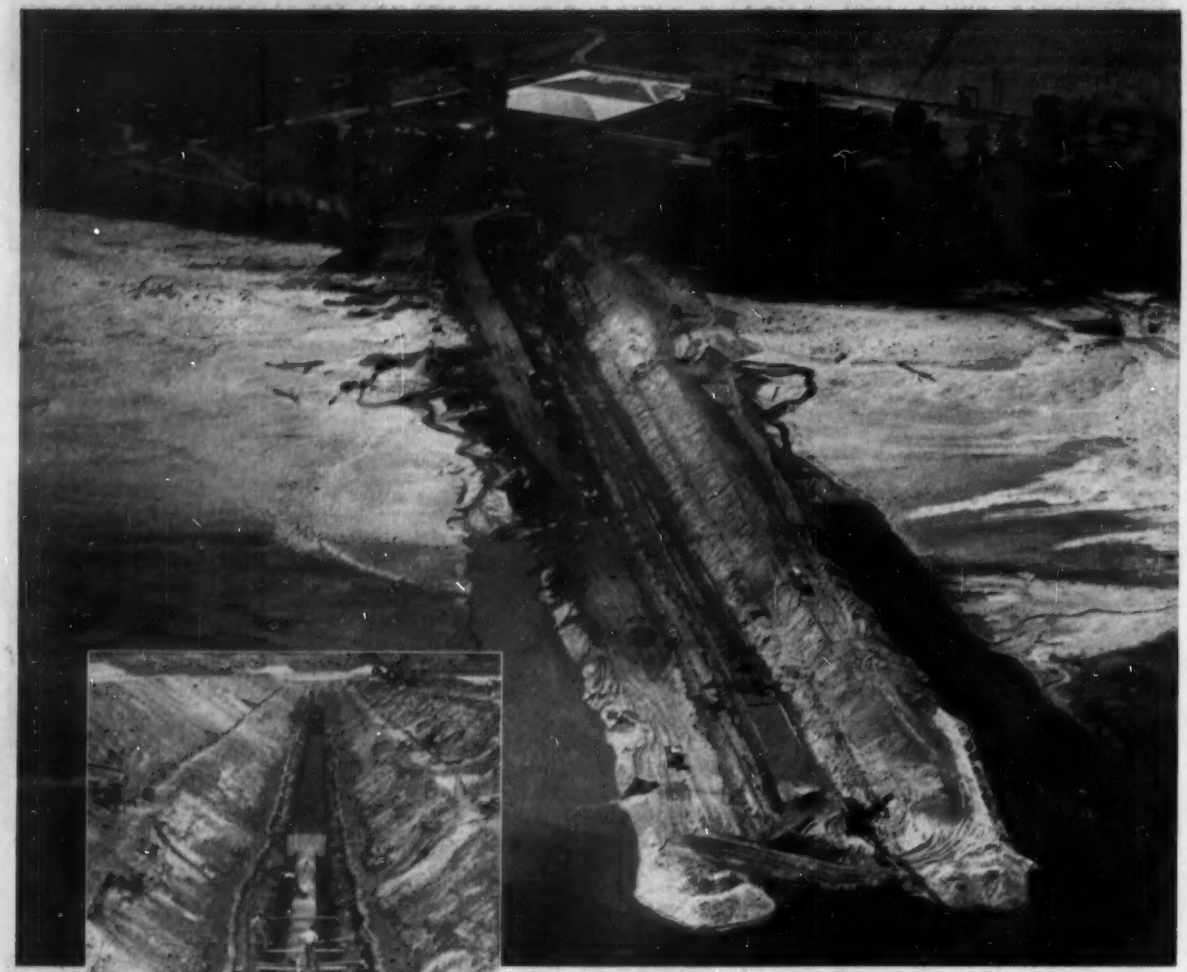
3-5 TON PORTABLE TANDEM

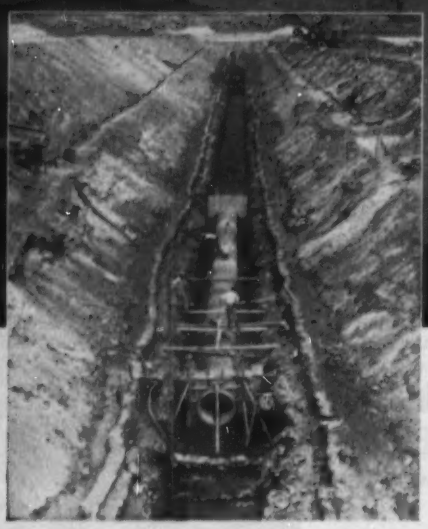
ishing jobs. It is highly maneuverable and portable from job-to-job. Write today for full information on the type of equipment you need—or see your nearest distributor for an on-the-job demonstration.

The Standard of Comparison

BUFFALO SPRINGFIELD

SPRINGFIELD, OHIO





Water, Water Everywhere but not a drop inside!

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PUTS THE SQUEEZE ON THE ARKANSAS RIVER

KEEPING THE WATER LEVEL DOWN with a wild, often summer-flooded river like the Arkansas all around you is a big order. That's why the STANG Wellpoint Engineers were called in to make possible the laying of this 54" water conduit with the river open.

STANG has successfully handled water problems the world over for many years. Our trained engineers have the capability and experience necessary to design the *exact* system to most efficiently and economically beat your particular unwatering problem.

If you have a water problem on a current project (or on one you may be bidding) contact STANG. You will receive a thorough analysis of your project needs and our recommendations *at no cost or obligation to you.*

Write today for our free 100-page Brochure on the STANG WELLPOINT SYSTEM.

Putting water in its place

...anyplace!

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553

EQUIPMENT NEWS . . .

Continued from page 186

turers claim that the new power train gives up to 300% torque multiplication at the output drive shaft. A tail shaft governor on the torque converter adjusts the engine speed automatically to meet all loads or conditions at any predetermined working or travel speed. Both graders have a power-shift transmission with four speeds forward and reverse. Fingertip control levers are designed to reduce operator fatigue. The T-600 has a 13-ft hydraulically shiftable moldboard as standard equipment.—**Galion Iron Works & Mfg. Co., Galion, Ohio.**

PRESTRESSED CONCRETE ANCHORS—A re-usable anchor called the Steelcase Strandvise has been developed to hold steel strand or rod under tension when concrete is being prestressed. The manufacturer claims the anchor will hold wires ranging from 150,000 to 230,000 psi at 4,000 to 18,000-lb tension. The unit has three cone-shaped jaws that securely grip the wire that passes through the steel casing and then holds it in place with a steel spring. —**Reliable Electric Co., 8145 Carroll Ave., Chicago 12, Ill.**

NEW TRUCK CRANES—Four new models and five new carriers have been added to the Quick-Way Truck Shovel Co. line. All the new cranes feature powered up and down boom as standard equipment, anti-friction bearings on all high-speed rotating shafts, chain and sprocket drives, and air-cooled clutch and brake drums. The models include a 5-ton, ¼-yd crane; and 8-ton, ⅜-yd crane; a 10-ton, ½-yd model and a 12½-ton, ½ yd model. A complete line of attachments is available. — **Quick-Way Truck Shovel Co., Denver, Colo.**

WHERE TO BUY

LOOK TO WILLSON
for another new development in head protection!

NOW—SUPER-TOUGH
PHENOLIC
SAFETY HATS AND CAPS

FROM THE WILLSON RESEARCH CENTER now comes the "Phenolic" line of scientifically designed safety headgear that meets all specifications with ease!

In this Super-Tough line are safety developments so outstanding that you'll find it offers unequalled value. For instance, the famed "geodetic suspension" and the unique pneumatic headband are obtainable in both adjustable *lace-in* and *snap-in* types of hats and caps.

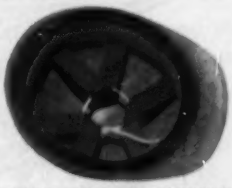
Ask your Willson distributor to demonstrate the heavy duty Phenolic line that combines comfort and maximum head protection. Or write for latest "Super-Tough" bulletin describing them in detail.

Strongest Made!

See how it's built up from 24 individual die cut pieces into a sturdy Phenolic pattern that withstands repeated 80-foot-pound drop ball tests without even fracturing!

LACE-IN SUSPENSION

Both hats and caps are available with convenient lace-in suspension feature. Easily adjusted for snug comfort to any head size.



SNAP-IN SUSPENSION

Handy Center-Tie snap-in type suspension is also obtainable in Super-Tough hats and caps. *Willson's exclusive patented "Geodetic Suspension" and Pneumatic Headband can be had in any style!*

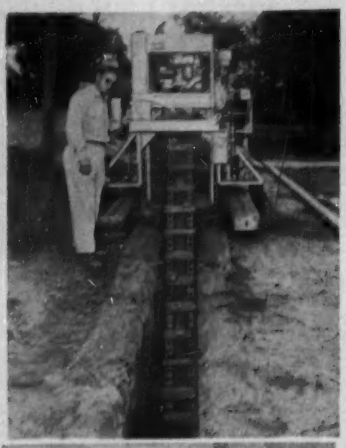
Over 300 safety products carry this world-famous trademark

WILLSON PRODUCTS, INC.
141 Thorn Street, Reading, Pennsylvania

"LOWEST MAINTENANCE COST OF ALL OUR DITCHING MACHINES"

Says: George Gabrielse
GABE'S CONSTRUCTION CO.
SHEBOYGAN, WISC.

"I've used Vermeer Pow-R-Ditchers for two years in laying gas pipe line mains and services. They can't be beat for maneuverability and efficient trenching. The cost of maintenance in comparison with our other ditching machines is surprisingly low."



VERMEER 524T POW-R-DITCHER DIGS 8"-10"-14"-18" & 24" WIDE and DOWN TO 6' DEEP!

Here's the low cost ditcher for contractors, municipalities, utility companies, etc. This self-propelled model 524T Pow-R-Ditcher digs at speeds of 1' to 15' per minute. Excellent for foundation footings, gas, water and sewage lines. Smaller Vermeer Pow-R-Ditchers also available. Write for name of nearest distributor and full information.

Some Excellent Sales Territory Available

VERMEER MFG. CO.
PELLA, IOWA

CONCRETE CARTS
EASY to WHEEL—EASY to DUMP

Perfectly Balanced!

No. 626-PR Sterling Cart with dumping rockers and 4.00 x 18 pneumatic tires.

Just the cart you need for hauling concrete or other materials. Takes a full batch from small mixers without danger of spilling. 6 cubic foot capacity, water full. Sterling quality construction. Tray made of 14 gauge steel with continuous ½" diameter butt-welded rod to reinforce top edge. 1¼" T-iron rockers facilitate dumping. Roller bearings standard equipment. Choice of 30" dia. steel wheels or pneumatics. Write for Sterling Cart Catalog.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

New Publications

These catalogs and bulletins from manufacturers contain useful information about construction equipment and materials. To obtain a copy, write directly to the manufacturer at the address given.

PRESTRESSED CONCRETE — The 1955 edition of Bibliography on Prestressed Concrete has been published by the American Concrete Institute. Expanded to 103 pages, the book now lists more than 2,100 American and foreign literature references on prestressed concrete that have been published since 1896. The complete bibliography sells for $2.00, but those who bought the 1954 edition can buy the 1955 supplement for $0.35.—**American Concrete Institute, 18263 W. McNichols Rd., Detroit 19, Mich.**

AGGREGATE MANUAL—The Aggregate Producers Handbook is a 124-page reference manual made up of material collected and edited by Donald D. Barnes, president of Smith Engineering Works. It includes information and specifications on aggregates and aggregate production machinery.—**Smith Engineering Works, Milwaukee, Wis.**

CARCO WINCHES — Owners of Oliver and Terratrac crawler tractors will find complete specifications on Carco winches especially designed for these tractors in two new specification sheets recently published by Pacific Car and Foundry Co. Illustrated are the E-24 winch for the Oliver OC-12 tractor and the Carco model C winch for Terratrac 200, 300, 400, and 500 tractors.—**Pacific Car and Foundry Co., Renton, Wash.**

WIRE ROPE—"Handling and Care of Wire Rope for Longer Service Life" is a 42-p handbook published by one of the largest wire-rope manufacturers. The purpose of the booklet is to discuss proper methods of handling and care that will help the average wire-rope user cut down the cost per ton of material moved by lengthening the life of rope.—**Bethlehem Steel Co., Bethlehem, Pa.**

CUMMINS DIESELS—40-p booklet has been published to answer the question: In what makes of shovels and trucks can I buy a Cummins diesel engine? The booklet is a directory of original equipment manufacturers who offer Cummins diesels as standard or optional equipment.—**Cummins Engine Co., Inc., Columbus, Ind.**

(Continued on next page)

It's built like a tire!

That's right! U.S. Royal Cord is built like a tire... *it has to be,* to take the battering it gets on all kinds of jobs, under extreme pressures. U.S. Royal Cord is hit by rocks in blasting; heavy tools fall on it; trucks and other vehicles roll over it; workmen pull it over jagged rocks. But U.S. Royal's unique cord construction, borrowed from "U.S." tiremakers, lets U.S. Royal come through unharmed. Needs no cribbing. Despite its great strength, this hose is very light and flexible.

- Tube of high quality neoprene for maximum oil resistance.
- Braided cotton breaker ply anchors tube to carcass everlastingly.
- *Exclusive:* Two counter-spiraled plies of tough special yarn floated in resilient rubber for outstanding strength, shear resistance and flexibility.
- Tough, brown, natural rubber cover (strongest ever put on a molded hose) gives excellent cut and abrasion resistance.

Buying second-rate, short-lived hose is no short-cut to economy. Get "U.S." quality hose for the biggest savings. No matter what your hose problem may be, "U.S." can solve it. Get in touch with any of United States Rubber Company's 27 District Sales Offices or write us at Rockefeller Center, New York 20, N. Y. You will obtain the correct job-engineered hose, and the guidance and advice of an expert staff of "U.S." engineers.

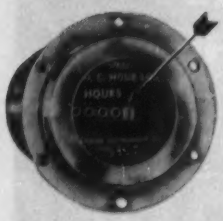
US RUBBER

Mechanical Goods Division

United States Rubber

LOOK! No Hands

ENGLER Direct-reading



D.C. HOUR LOG

Indicates hours and minutes of operation of powered equipment. Provides maintenance records and assures maximum utilization of equipment.

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TRACTORS • PUMPS • BOATS
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NEW PUBLICATIONS . . Continued

CLEAN BY STEAM—A new 4-p catalog describes and pictures the entire line of Malsbary steam cleaners. It describes the differences between high pressure, steam vapor, and fireless steam cleaners, and recommends cleaners for specific jobs. Action photos of eight basic models are included.—**Malsbary Manufacturing Co., 845 92nd Ave., Oakland, Calif.**

NEW CHALLENGER—a 12-p bulletin illustrates the ¾-yd Model 510 Unit Challenger. It describes in detail such features as hydraulic clutch control, full floating trunion mounted taper drums, self-aligning hook shoes, and force feed lubrication. —**Unit Crane and Shovel Corp., Milwaukee 14, Wis.**

CRUSHING PLANTS — Denver Equipment Co. has published a new bulletin, No. C12-B16, to present the facts about the new Type J portable and semi-portable crushing plants. Specifications and diagrams are given for the portable crushing, screening, and loading plant and for two other highly mobile units, the portable crushing unit and the Denver trailer crushers.—**Denver Equipment Co., P. O. Box 5268, Denver 17, Colo.**

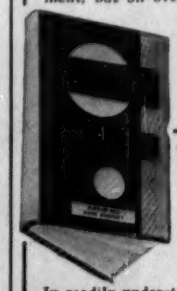
POWER UNIT—An 8-p bulletin called "Now-AC Power Goes Anywhere a Vehicle Can Go" describes the new mobile Mo-bil-ac AC power unit and gives technical information to back up that claim. Mo-bil-ac units supply up to 10 kw at standard voltages and frequency, yet are small enough to be mounted under the hood of a truck.—**Star-Kimble Div., Michle Printing Press & Mfg. Co., 200 Bloomfield Ave., Bloomfield, N.J.**

HANDBOOK ON ROCKS—A 68-p pocket-size booklet called "Drillers Handbook on Rock," is said to be one of the most comprehensive drilling manuals ever compiled. It contains a complete description of all common rock and discusses their hardness, texture and formation. Readers are instructed how to judge the speeds with which various rocks can be drilled. Modern drilling equipment, ranging from light hand rock drills to large truck-mounted rotary air and mud drills, are illustrated. Booklet copies are available at $1.50. —**Rock Drill Div., Davey Compressor Co., Kent, Ohio.**

GRADALL ATTACHMENTS—An illustrated booklet shows 20 different attachments that will extend the usefulness of the multi-purpose Gradall. Included are illustrations of various sizes and shapes of buckets, a single-toothed ripper, scraper blade, concrete bucket, boom extensions and a roller. The booklet is titled "How To Beat Competitive Bidding with Gradall Attachments."—**Warner & Swasey Co., Cleveland, Ohio.**

ESTIMATING CONSTRUCTION COSTS

Here are the practical considerations you need to know to make accurate estimates on engineering projects—the understandable methods and helpful data you need for realistic, sound estimating. Each major type of construction is covered in detail not only on materials, labor, and equipment, but on overhead and profits as well.



Over 100 time-saving tables help you make speedy, accurate estimates. By R. L. Peurifoy, Professor of Civil Engineering, A&M College of Texas. 350 pp., 60 illus., $8.00

LEGAL CASES FOR CONTRACTORS, ARCHITECTS, AND ENGINEERS

Just Published!

In readily understandable language, a noted engineer-attorney discusses 52 important legal problems that may crop up on construction projects; cites actual cases which set forth or sustain principles involved. **Helps you act preventively before the situations described arise;** know when to seek competent legal advice of an attorney. By I. V. Werbin, Member, N.Y. Bar. 487 pp., $6.00

SURVEYING

Instruments and Methods

A handy guide to precision in small-area surveying in the field and shop. Whether you are aligning machinery, planning construction, setting a jig, or making a map, it shows you the most accurate and rapid methods of surveying the job. Describes everything of importance from the care and use of instruments and equipment to practical techniques for solving hundreds of specific problems. By P. Kissam, Princeton University. 384 pp., 260 illus., $5.50

JUST OUT

PROFESSIONAL ENGINEER'S EXAMINATION

QUESTIONS AND ANSWERS

Over 500 questions and complete answers to help engineers pass state license examinations. Covers mechanical, electrical, civil, and chemical engineering, and includes engineering economics and land surveying. Latest questions—suitable for all states. Author has worked on New Jersey examination preparation for 19 years. By William S. LaLonde, Jr., 462 pp., 233 illus., $6.50.

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Big output is built in

Individual Design

We believe that the right way to build an excavator is to match every part—from boom point to treads—to the specific rated capacity of the machine. At Bucyrus-Erie we call this Individual Design.

Here's what it means

Individual Design means striking the right balance between power, weight and speed for sustained high output at low cost over a long period of time. Bucyrus-Erie excavators match engine to dipper size so there's no waste of power; deck machinery components are not overloaded or underworked; boom strength and weight are right for the dipper size. There's never any overdippering or underpowering.

Here's how it pays off

This kind of design keeps Bucyrus-Erie excavators out front in production, with all parts working in smooth, efficient coordination. It keeps them on the job year after year with minimum down time and maintenance—there is no excess wear and tear on moving parts.

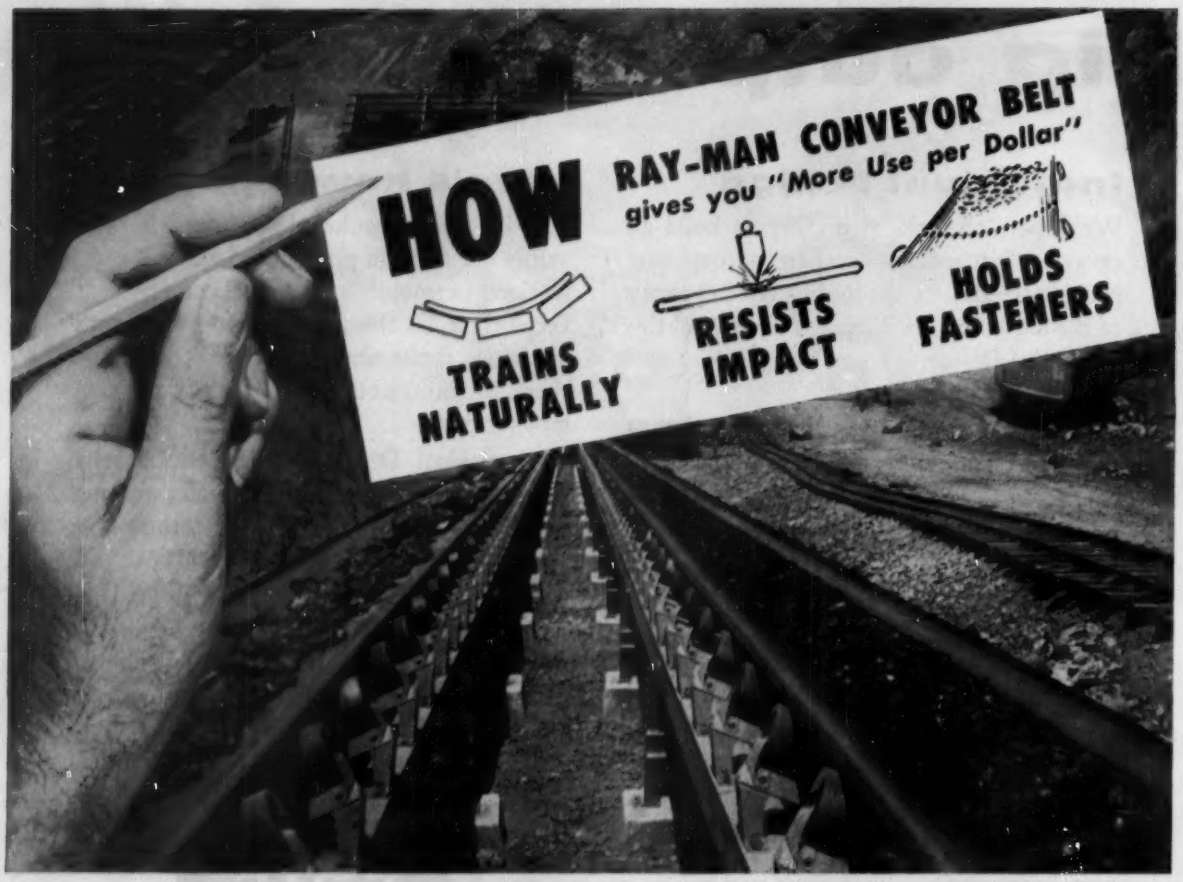
Individual Design is a big reason why Bucyrus-Erie excavators are still working profitably when others have lost their usefulness.

Your operations can use this kind of money-making performance so get the full details from your nearby distributor. He has all the facts on Bucyrus-Erie excavators from 3/8 to 4 cu. yd. 155E55

A grading project on U.S. Highway 85-87, near Greenhorn, Colo., was handled by this 1½-yd. Bucyrus-Erie 38-B. Machine owner is the Pioneer Construction Co. of Pueblo, Colo.

BUCYRUS ERIE

South Milwaukee, Wisconsin



Many Users Say This Belt Outlasts Them All

The Ray-Man Conveyor Belt features a new and different construction of covers and strength member to resist cuts, tears and abrasion to a degree never before attained. R/M's exclusive "XDC" Cover provides a degree of protection and long life not possible with any other belt. Inside this cover, Ray-Man Conveyor Belt combines elastic cushioned strength member plies in an envelope of strong, yet flexible synthetic fabric to resist gouging and tearing ... to take the impact of large, abrasive lumps... to permit the belt to trough easily and train naturally.

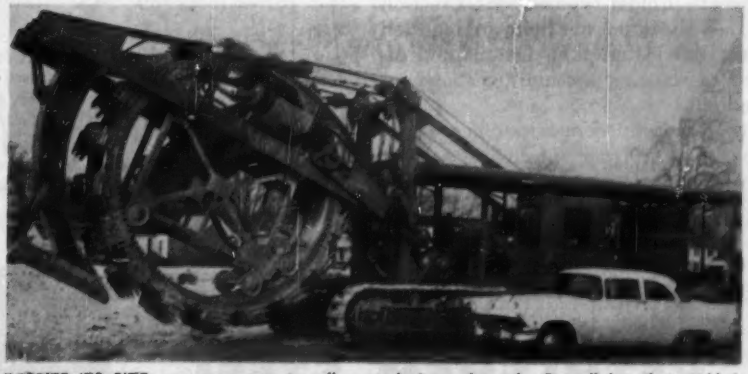
Like all Manhattan heavy duty conveyor belts, Ray-Man is moisture resistant and mildew-proof. It requires no breaker strip and holds fasteners considerably better than other types of belts. Let an R/M representative show you the advantages of Ray-Man as well as other R/M conveyor belts, including Homocord, with its extra cushion for unusually abusive shock loading. He'll help you select the belt best suited for your job . . . one designed to give you "More Use per Dollar." Write for Bulletins 6906 and 6915.

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings • Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

GAR WOOD-BUCKEYE 330 ditcher is specially designed for large diameter pipe line jobs. During tests it dug 600 yd per hr while cutting trench 11¼-ft deep and 5 1/3-yd wide.



DESPITE ITS SIZE, one man operates all controls from the cab. Overall length is 53½-ft and ditching wheel is 17½-ft dia. Hydraulic hoists raise or lower the wheel.

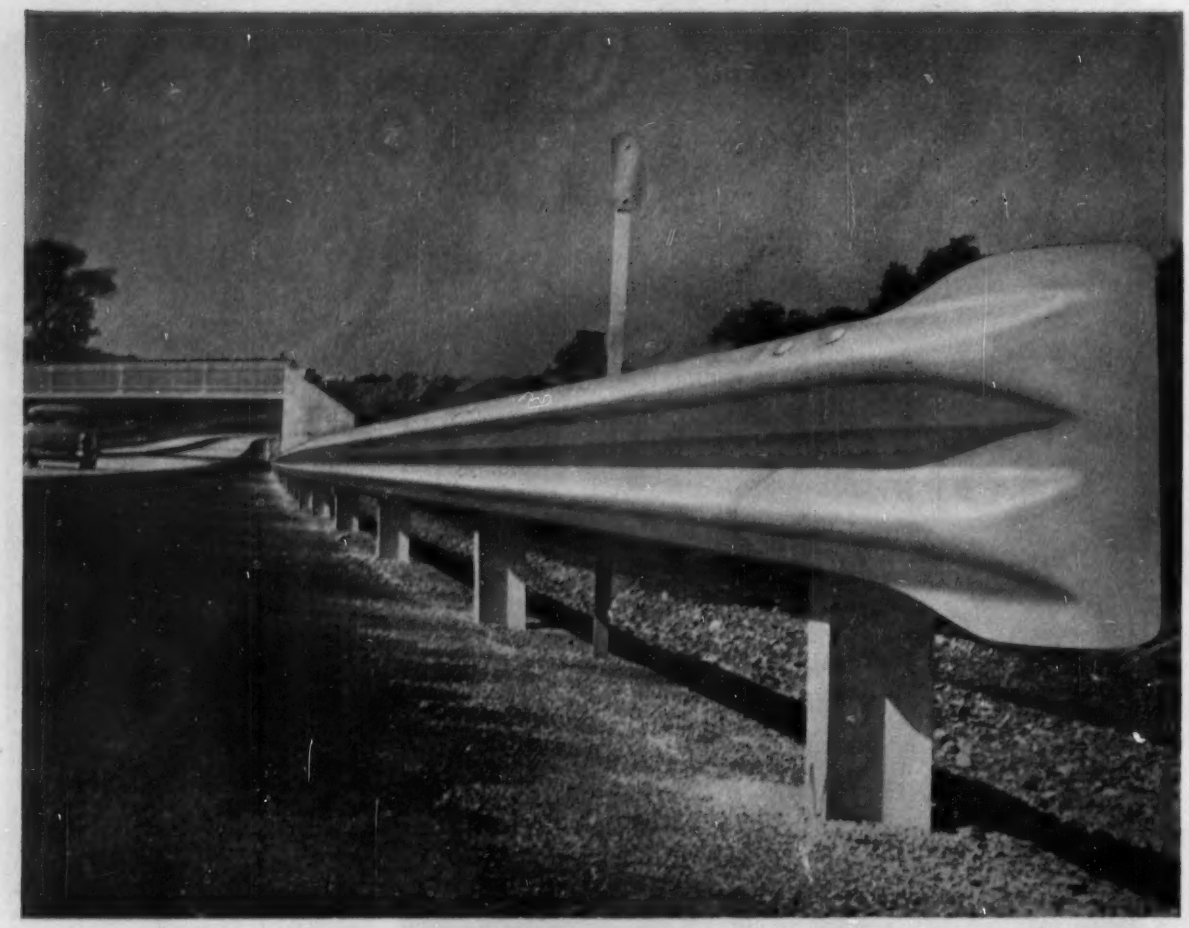
New Ditcher Bites Out Big Trench

A NEW GIANT DITCHER, the 110,000-lb Gar Wood-Buckeye 330, excavates 600 yd per hour and cuts a trench 11¼ ft deep and 5 1/3 ft wide. The ditcher, powered by a 220-hp Caterpillar diesel engine with a torque converter, is designed to handle large diameter pipe-line excavation and deep sewer work.

Most large pipe-line excavation is handled by ¾-yd backhoes. Gar Wood-Buckeye engineers claim that the backhoe is productive only 37% of the time—because of its swing and dump cycle—but the new ditcher is continuously productive. During tests it exceeded 600 yd per hour digging in clay with a high moisture content.

Two Allison torquematic transmissions give the ditcher 15 digging speeds and a reverse gear. Its huge 17½-ft dia digging wheel is lowered and raised by two hydraulic hoists, each with separate controls to allow independent or simultaneous operation. The dirt conveyor also operates independently with elevation controlled by a hydraulic unit.

The big ditcher, 16-ft high over the uprights and 53½ ft long, is mounted on 30-in. tracks at the rear and pneumatic tires at the front. Despite its size only one man is required to operate it; all controls are located in the operator's cab. According to Gar Wood-Buckeye engineers, the ditcher is the largest piece of construction machinery to be equipped with power steering.



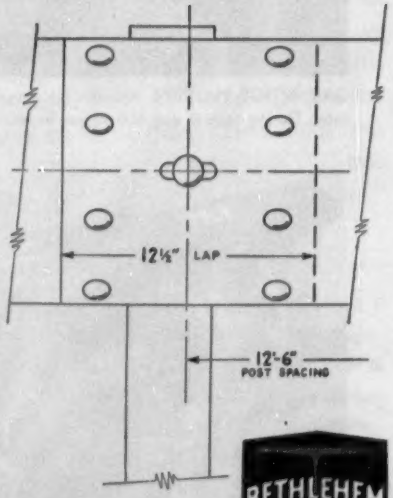
INTRODUCING
Bethlehem Beam Guard Rail

In order to meet the ever-increasing demands of the road-building industry, Bethlehem has added a new section of highway beam guard rail to its list of products. Tests show the new section, made from 10- and 12-gage steel, to be stronger than older-type sections. Erection is simplified because fewer bolts are required for permanent installation. Details and dimensions of the new section are shown at right and left.

The nearest Bethlehem sales office will be glad to supply further information about Bethlehem Beam Guard Rail.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



BETHLEHEM STEEL

BETHLEHEM STEEL

NEW PUBLICATIONS . . .

Continued from page 192

TRENCHERS AND BACKFILLERS—The complete line of Cleveland trenchers and backfillers is described in a 4-page bulletin. The bulletin is designed to provide readers with a convenient comparison of the capacities, specifications, and dimensions of Cleveland's six trenches and two backfillers.—**Cleveland Trencher Co., 20100 St. Clair Ave., Cleveland 17, Ohio.**

PIONEER SCREENS—A two-color, 20-page booklet describes the Pioneer Engineering Works line of Super Service vibrating screens. In addition to text material on the screens and data tables showing capacities, the illustrated booklet describes washing attachments, spouts, chutes, hoppers, and proper installation techniques. Pioneer vibrating screens are primarilly used for handling heavy materials such as crushed rock, gravel, sand, limestone, and ore.—**Pioneer Engineering Works, Inc., 1515 Central Ave., Minneapolis, Minn.**

MATERIALS HANDLING—Bulletin No. 90 describes Silent Hoist materials handling equipment especially designed for the construction field. Included are descriptions and specifications of the Mobile swing-boom crane called the Krane Kar, the front-boom crane called the Karri-Go, the Krane Krawler swing-boom crane, and the Liftruck fork lift truck.—**Silent Hoist & Crane Co., Inc., 841877 63rd St., Brooklyn, N. Y.**

GUNITE FOR EROSION—"Erosion Control with Gunite" is a 4-page bulletin recently published by the Gunite Contractors Association. The booklet describes the erosion control made possible when gunite is used on slopes where it is not practical to plant a heavy ground cover. Several illustrations of slopes that were successfully protected by gunite are included.—**Gunite Contractors Assn., 714 W. Olympic Blvd., Los Angeles 15, Calif.**

JOBMASTER—Lima's recently introduced ½-yd power shovel, known as the Type 24 Jobmaster, is described in a new bulletin which illustrates the machine's applications as a shovel, crane, dragline or pull shovel, with crawler, wagon or truck mountings. — **Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio.**

MARION LINE—A colorful 40-p bulletin describes the complete line of Marion excavating and materials handling machines. Called bulletin 403-C, it features action photos of each basic machine type and gives condensed specifications for all Marion models.—**Marion Power Shovel Co., Marion, Ohio.**

PLAY IT SAFE with MILLER Tilt-Top!

Miller's big broad oak decked platform assures the safety of operator and equipment every time you load! Saves time, too . . . there's no need to bother with special skids, cribbing or jacks. ONE man simply drives on or off the tilted platform. Total time, less than two minutes! Whatever you haul . . . dozers, trenchers, rollers or other heavy equipment, there's a MILLER TILT-TOP to do your between-job hauling faster, safer and at less cost! See your MILLER distributor today!

Heavy D-4 dozer being loaded on Model "B" 10 ton TILT-TOP built upon the new, massive "EDG-SUPPORT" frame, now standard on all MILLER TILT-TOPS.

✓ built best
✓ priced best

See your MILLER distributor or write for FREE literature to:

Miller Tilt-Top Trailer Co.
457 S 92nd Street, Milwaukee 14, Wis.

COLD WEATHER
Can't stop Chicago contractor Helmar Hedman and Summeraire

300,000 BTU's PER HR. . . . yet priced 20-30% lower than smaller heaters

Clayton SUMMERAIRE PORTABLE, OIL FIRED SPACE HEATER

Helmar Hedman, like all contractors, makes money when jobs are finished on time . . . *weather or not.* Summeraire chases winter cold . . . dries out new construction; prevents freezing of concrete while curing; keeps workmen warm. Durable, portable, self contained; electric or gasoline engine drive, Summeraire delivers 2400 cu. ft. high velocity heated air per minute at amazing economy. 300,000 BTU capacity at a price 20-30% lower than that of smaller heaters.

for Fast, Low Cost HEATING DRYING THAWING

CLAYTON MANUFACTURING CO., Box 550 El Monte, California CME-1
Without obligation, send complete details, prices and name of nearest Summeraire dealer.

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Send New Advertisements to N.Y. office, 330 W. 42 St., N.Y. 36, N.Y. for Feb. issue closing Jan. 26th. [C.M.]

The **advertising rate** is $18.00 per inch for Equipment & Business Opportunity advertising appearing on other than a contract basis. Contract rates quoted on request.

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Your inquiry will have Special value . . .

If you mention this magazine, when writing advertisers. Naturally the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

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The THORO System of Masonry Protection

THOROCLEAR

Invisible Water Repellent

Ask your dealer about this powerful silicone water repellent developed by years of research by General Electric Company and now produced by us for your protection. *Ask for Circulars No. 30 and 31.*

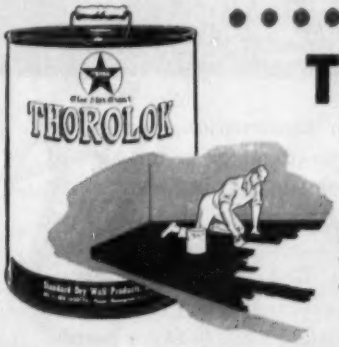
No change in color or texture of brick, limestone, sandstone, tile or stucco surfaces. Applied by brush or spray.

Keep water out of your masonry walls and protect interior plaster, paints and expensive furnishings.

THORITE

20 Minute Set Patching Compound

Repair those broken sills, steps, concrete floors, chimneys and other defective masonry! *Ask for circular No. 20.*



THOROLOK NO. 100

Use it for your basement or factory floors. Now, with special alkali resistant pigments. *Ask for Color Card 32-C.*

Manufacturers of

WATERPLUG, THOROSEAL, QUICKSEAL

for all types of masonry protection!

GET OUR PICTORIALLY DESCRIBED LITERATURE "HOW TO DO IT"

STANDARD DRY WALL PRODUCTS, INC.
NEW EAGLE, PENNSYLVANIA

NAYLOR

...the "Shortest Line" between Two Points

With the accent on speed in construction, you'll find Naylor Spiralweld pipe made to order for laying air and water lines in a hurry. Naylor pipe is light in weight so it's easy to handle, easy to install. You can assemble lines faster—even where the going is rough—especially when you use the Naylor one-piece Wedge-Lock coupling to simplify connections. From every angle, you can depend on Naylor to give you the "shortest line" between points. Sizes range from 4" to 30" in diameter with wall thicknesses from 14 to 7 gauge. Bulletin No. 507 tells the story about this distinctive light-weight pipe and coupling combination. Write for it today.

NAYLOR PIPE

NAYLOR PIPE COMPANY
1268 East 92nd Street
Chicago 19, Illinois

Eastern U. S. and Foreign Sales Office: 350 Madison Avenue, New York 17, New York

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CONSTRUCTION METHODS AND EQUIPMENT

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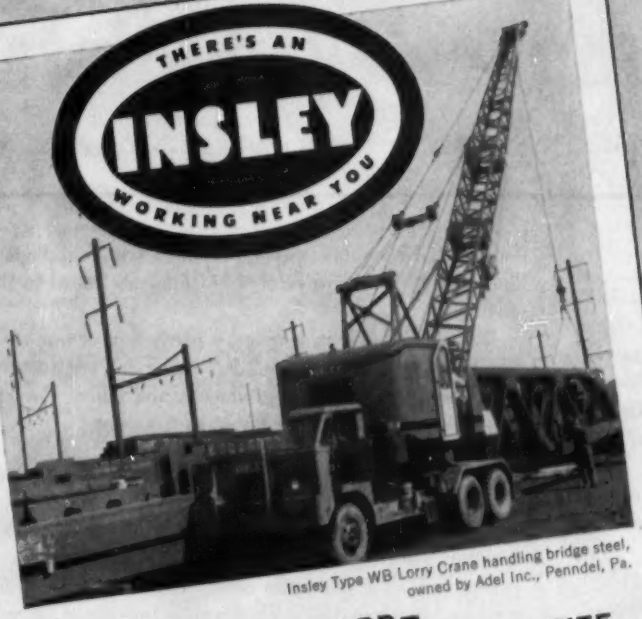
INSLEY
WORKING NEAR YOU



Insley Type WB Lorry Crane handling bridge steel, owned by Adel Inc., Penndel, Pa.

**IN THE SORTING YARD—
OR ON THE BRIDGE SITE**

Fast action in the sorting yard is a must for quick completion of any bridge building job.

For the sorting yard and the next step—erection . . . the Insley Type WB crane with lorry mounting has the mobility and proven performance features to get the job done on schedule.

Excavators and Cranes 5 to 35 Ton Capacity

INSLEY MANUFACTURING CORP. • INDIANAPOLIS, INDIANA
wholly owned subsidiary **THE MAXI CORP., LOS ANGELES, CALIF.**

Methods Memo . . .

Dozer Rescues Plane

A bulldozer operator is a hero in Pleasantville, N.Y. Mounted on a Caterpillar D-8, he charged to the rescue of a small, private plane caught in a snowstorm and unable to find a safe place to land.

Dr. Lynn L. Bollinger, president of Helio Aircraft Corp., was flying alone from New Jersey to Boston when the storm struck. Ice began to form on his plane, and it lost power. Then, his radio failed. He had to land quickly, but he couldn't pick out a safe spot on the snow-covered ground.

Angelo Coluccini, at work for Steward H. Muller Corp. on a grading job, noticed the plane circling overhead. He tried, but failed, to direct it toward an airfield. So he cleared an emergency landing strip of snow so that the brown earth showed up clearly. A grateful Dr. Bollinger landed safely.

Our Mechanized Future

Within 30 years or so, contractors will be building houses of glass—or rather, "vitreous foam." That's the opinion of science consultant George R. Price, who made the prediction in "Challenge," a New York University publication.

"I foresee," he said, "furnaces borne on trucks that will melt a mixture of sand, alkaline rocks, and limestone. The molten glass thus created will be mixed with air and blown out through hoses to produce foundations, exterior walls, and roofs. Walls 1 ft thick will be quickly and cheaply built up in any shape desired. Outer surfaces will be smooth and hard, made from solid glass unmixed with air and colored by pigments added to the melt."

Well, if he is right, we have a prediction of our own. We foresee a pretty rocky road ahead for contractors, equipment and materials producers, and labor. For example, which union does what in such a setup?

Two New Features

CM&E begins two new features with this issue. Construction News from Washington on page 9 will keep you posted on Washington news of importance to contractors. McGraw-Hill's Washington Bureau of 16 veteran capital correspondents will report for you significant news you won't find in any other publication.

The Maintenance Shop on page 145 will supply time and money saving tips on equipment care to supplement our regular coverage of maintenance news. Assistant Editor Frank Corrigan digs out this information from manufacturers and from construction men with on-the-job maintenance experience.

AGC's Booklet

Contractors can profit from an AGC booklet containing schedules for the processing of change orders and disputes on jobs for the three principal federal construction agencies. Corps of Engineers, Bureau of Yards and Docks, and Bureau of Reclamation have agreed to the schedule. Copies at 20¢ each are available from AGC, Munsey Building, Washington 4, D.C.

Union "Brass" Goes to Work

Three union leaders man the block and tackle to hoist into place the last of more than 7,000 stainless steel panels for the Socony Mobil Building in New York. They are (left to right): J. H. Lyons, general president of the International Association of Bridge, Structural, and Ornamental Ironworkers; Albert Mendes, business agent of the union's New York local; and Joseph F. Boyen, general vice president of the union. In the background are some 40 other hard-hatted big-wigs of construction on hand for the ceremony. The 45-story building is scheduled to be completed this spring. Turner Construction Co., New York, is the general contractor. F. H. Sparks Co., Inc., New York, erected the panels.

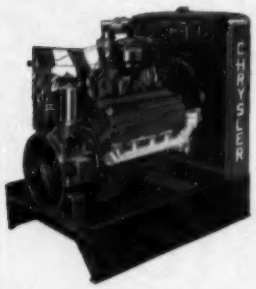
Install Chrysler Industrial Engines

... best-engineered, most-economical answer to your power problem

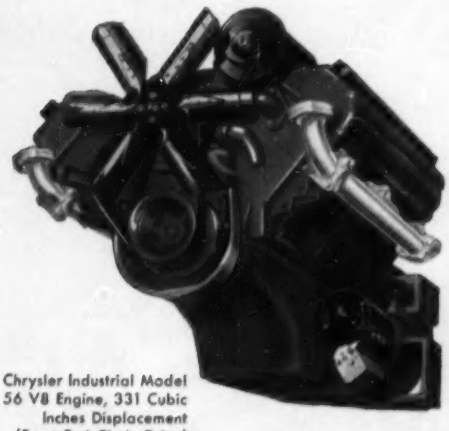
Chrysler Power is the *dependable*, economical, lightweight answer to your high-speed or high-torque power requirements. Within their power ranges, each Chrysler Industrial Engine is a leader in the field and is recognized as such by manufacturers of almost every type of self-powered equipment.

Check the specifications. Note the optional equipment which can be factory supplied or installed to meet the particular requirements of your equipment in the field. Whether equipped for Gasoline, Distillate Fuel, Propane or Natural Gas operation, Chrysler Industrial Engines offer definite advantages . . . performance, ease of maintenance, fast parts service, low initial and operating costs.

See the dealer nearest you, or write for complete information. *Dept. 81, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.*



Chrysler Open Power Units. The open power units for all engines include the complete engine, skid base, radiator, instruments and instrument panel, flywheel and flywheel housing. Open power units for V-8 Models Ind. 52 and 56 (pictured), include twenty-five gallon fuel tank.



Chrysler Industrial Model 56 V8 Engine, 331 Cubic Inches Displacement (Front End Chain Drive)

Chrysler Industrial Model 33 Engine, 265 Cubic Inches Displacement (Front End Gear Drive)

Chrysler Enclosed Power Units. The enclosed power units have the complete engine, fuel tank (Models Ind. 30, 31, 32 and 33—sixteen gallon. Models Ind. 52 and 56—twenty-five gallon), storage battery, instruments and instrument panel, flywheel, flywheel housing, skid base and completely enclosing sheet metal.

Optional Equipment—Chrysler Engines

- Chrysler Industrial Torque Converter
- Chrysler gyrol Fluid Coupling
- Three, Four or Five-Speed Transmission
- Twelve or Twenty-four Volt Electrical System
- Distillate, Propane or Natural Gas Burning Carburetor
- Over-Center Clutch and Power Take-Offs
- Vertical or Horizontal Magnetos
- Flexible Coupling for Truck-Type Flywheel
- Radio Shielding and Ignitors
- Heavy-Duty Oil Bath Air Cleaners
- Safety Switches (Low Oil Pressure, High Water Temperature)
- Corrosion or Fungus Resistant Electrical System

GENERAL SPECIFICATIONS — ALL MODELS

	Ind. 30	Ind. 31	Ind. 32	Ind. 33	Ind. 52	Ind. 56
No. of Cylinders	6	6	6	6	8	8
Type of Engine—4 Cycle	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline	Gasoline
Bore—Inches	3 1/4	3 1/4	3 7/8	3 7/8	3 7/8	3 15/16
Stroke—Inches	4 1/2	4 1/2	4 3/4	4 3/4	3 1/4	3 1/2
Displacement—Cu. In.	230	230	265	265	270	331
Compression Ratio	7.0	7.0	6.8	6.8	7.5	7.5
Valves—Arrangement	L	L	L	L	Vee	Vee
Pistons—No. Rings	4	4	4	4	3	3
Crankshaft—Bearings	4	4	4	4	5	5
Camshaft Drive	Silent Chain	Gear	Silent Chain	Gear	Silent Chain	Silent Chain
Camshaft—Bearings	4	4	4	4	5	5
Crankshaft—Bearing Diameter	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 3/8"	2 1/2"
Lubrication—Type	Press.	Press.	Press.	Press.	Press.	Press.
Lubrication—Type Oil Pump	Rotor	Rotor	Rotor	Rotor	Rotor	Rotor
Lubrication—Oil Capacity Qts.	5	5	5	5	5	5
Ignition—Battery Type	Yes	Yes	Yes	Yes	Yes	Yes
Spark Plug—Size	14 mm	14 mm	14 mm	14 mm	14 mm	14 mm
Starting—Elec. Type	6 Volt	6 Volt	6 Volt	6 Volt	6 Volt	6 Volt
Gen. Reg.—Full Voltage	45 Amps.	45 Amps.	45 Amps.	45 Amps.	45 Amps.	45 Amps.
Gen. Reg.—Full Voltage and Current Control	Yes	Yes	Yes	Yes	Yes	Yes
Carburetor—Type	Down-Draft	Down-Draft	Down-Draft	Down-Draft	Down-Draft	Down-Draft
Fuel Pump	Yes	Yes	Yes	Yes	Yes	Yes
Weight—Approx. (Lbs.)	575	610	740	760	591	845

Specifications subject to change without notice.

HORSEPOWER WITH A PEDIGREE

CHRYSLER INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

How high load capacity is built into less space in Dodge-TIMKEN All-Steel pillow block

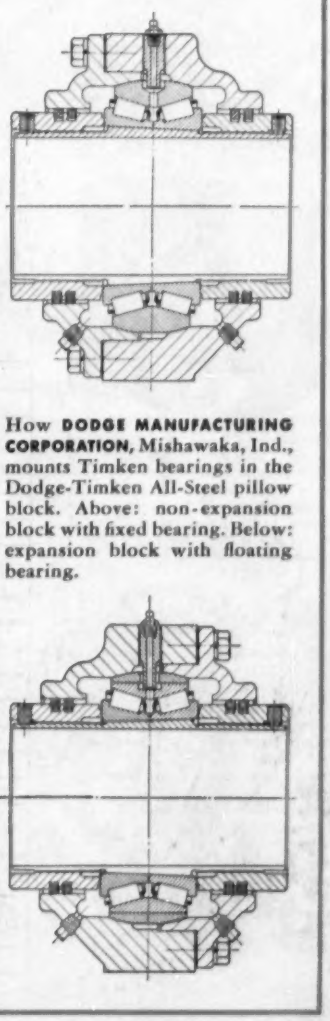
THIS rugged Dodge-Timken pillow block packs more capacity in less space than ever before. All-steel construction gives it extra strength and durability. The design is compact. No special thrust devices that take up extra space are needed—the two-row Timken® tapered roller bearing takes *both* radial and thrust loads in any combination. And full line contact between the rollers and races assures high load capacity.

The cutaway view below shows the bearing. It is of special design, with tapered bore and self-aligning spherical outer surface—never requires adjustment. As in all Timken bearings, races and rollers are case-carburized and have tough, shock-resistant cores under hard, wear-resistant surfaces. Under normal conditions, the Timken bearing will last the life of the machinery with which the pillow block is used.

In addition to the all-steel pillow block shown here, Timken bearings are also used in the Type "E", Double-Interlock, Type "C", and Special-Duty pillow blocks—other versatile pillow blocks in the Dodge-Timken line with a wide variety of uses in industry.

To be sure of the finest bearing steel, we make our own—America's only bearing manufacturer that does. No other bearings can give you all the advantages you get with Timken bearings. Include them in your design plans... specify them for the machines you buy or build. Look for the trademark "Timken"—it's on the bearing that makes any machine run better. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **DODGE MANUFACTURING CORPORATION,** Mishawaka, Ind., mounts Timken bearings in the Dodge-Timken All-Steel pillow block. Above: non-expansion block with fixed bearing. Below: expansion block with floating bearing.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION